

[97e-13-R18-NCR] - Version 0.0.9
RAN

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3GPP TSG RAN Meeting #97-e

Electronic Meeting, September 12-16, 2022

Source: ZTE

Title: Moderator's summary for discussion [97e-13-R18-NCR]

Agenda Item: 9.1.1

Document for: Discussion and Decision

1 Introduction

As part of the Rel-18 RAN package [1], the item of NR network-controlled repeaters (NCR) is approved as a SI followed by a WI for normative phase according to the endorsed plan. The detailed scope of this SI is listed in [2]. According to the WG-level discussion, the SI has been completed across all involved WGs as highlighted in the status report [3] with the corresponding TR 38.867 in [4]. In this meeting, contributions from individual companies have been submitted to discuss the scope of the WI in [5][6][7][8][9][10][11][12][13][14][15][16].

2 Initial round discussion on the scope of Rel-18 NCR WI

2.1 Scenarios and assumptions for NR NCR

As listed in [2], some scenarios and assumptions are highlighted for SI. These are captured in the justification part of the proposed WID RP-222437. For the normative phase, considering the progress along with the NCR model captured in TR38.867 [4], the following assumptions (with more clarification with underline) are proposed as guidance for WI:

- The normative phase of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:
 - *Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867.*
 - *For only single hop stationary network-controlled repeaters*
 - *Network-controlled repeaters are transparent to UEs and without awareness of forwarded data.*
 - *Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

To collect views on this aspect, companies are encouraged to provide views on Question 2-1.

Feedback Form 1: Q2-1: Any views on the proposed scenarios/assumptions above?

<p>1 – OPPO</p> <p>Our comments are as following:</p> <p>1) Some information listed in bullets, such as UE transparency and support of both FR1 and FR2, are too important to be held in justification part. We prefer to move these bullets to objectives part.</p> <p>2) For "without awareness of forwarded data", does it refer to the "existence of the forwarded data" or "content of the forwarded data"?</p>
<p>2 – Deutsche Telekom AG</p> <p>We think these 4 points are all correct and relevant to guide the WID</p>
<p>3 – Qualcomm Incorporated</p> <p>We support all of these 4 points. We agree with Oppo that "without awareness of forwarded data" is not clear. Should it state "Network-controlled repeaters are transparent to UEs and do not have to decode the forwarded data."?</p>
<p>4 – Pivotal Commware</p> <p>We also agree with 4 points and we agree with QC's offered clarification of transparency.</p>
<p>5 – Apple France</p> <p>We support the 4 bullets and also agree with QC's update to 3rd bullet</p>
<p>6 – CableLabs</p> <p>Support all these 4 points and also support QCM's clarification</p>
<p>7 – NTT DOCOMO INC.</p> <p>We support the 4 points and Qualcomm's clarification.</p>
<p>8 – Futurewei Technologies</p> <p>We also support these 4 points and Qualcomm's revision for clarification.</p>
<p>9 – Sumitomo Elec. Industries</p> <p>We support all four bullet with QCM's clarification.</p>
<p>10 – Intel China Ltd.</p> <p>We support all these 4 points.</p> <p>For 3rd bullet, though we think the current wording would be sufficient, we're also fine with QC's update.</p>

<p>11 – NICT</p> <p>We support all these 4 points and Qualcomm’s clarification.</p>
<p>12 – China Mobile Com. Corporation</p> <p>We are fine with the 4 bullets and the updates from QC.</p>
<p>13 – China Telecommunication Corp.</p> <p>We support all the 4 points and fine with Qualcomm’s clarification.</p>
<p>14 – Samsung Electronics Co.</p> <p>We also support to remove ”without awareness of forward data”</p>
<p>15 – KDDI Corporation</p> <p>We support all these 4 points and also support QCM’s clarification.</p>
<p>16 – Fujitsu Limited</p> <p>We are fine with the 4 bullets and OK with QC’s suggestion</p>
<p>17 – HuaWei Technologies Co.</p> <p>We are fine with most of them, except applying it for both FR1 and FR2. In RAN1’s study there is no clear recommendation whether this feature applies to FR1, as during the study only few inputs on this and some of them showed the gains are marginal or even negative in some cases. It is therefore unclear whether there is gains to apply to FR1 compared with the existing RF repeater. In addition in RAN4 OTA requirements regarding to beam management are only defined for FR2, and it is unclear whether it is feasible to define this for FR1 in RAN4.</p> <p>Regarding ”without awareness of forward data”, we think this statement makes sense and ”does not have to” may lead to the confusion the repeater can anyway decode the data, which may touch the security again. Therefore we prefer to keep the previous statement.</p>
<p>18 – AT&T GNS Belgium SPRL</p> <p>We are fine with the 4 bullet points that were listed in the TR and suggest reverting back to the original TR text for bullet 3:</p> <p><i>Network-controlled repeaters are transparent to UEs and without awareness of forwarded data.</i></p>
<p>19 – ZTE Corporation</p> <p>We are fine with the 4 bullets.</p> <p>Regarding the clarification on the “without awareness of forwarded data”, compared to the QC’s updates, it’s slightly preferred to change it to “without awareness of the content of forwarded data” since it’s more aligned with the concept of the repeater.</p>

For the applicable frequency range, as captured the in the SID, we already highlight that “Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands”. Meanwhile, the defined solutions for side control, e.g., on-off, is a general feature without additional impacts for a certain frequency range.

20 – KT Corp.

KT is fine with the 4 bullets and Qualcomm’s clarification on the 3rd bullet.

21 – Telstra Corporation Limited

Telstra is happy with the four points along with the Qualcomm clarification on the third point.

22 – Panasonic Corporation

We support the proposal.

On Qualcomm clarification of “Network-controlled repeaters are transparent to UEs and do not have to decode the forwarded data”, the common channel/signal like SFI are forwarded data but these may be decoded by NCR. Such discussion needs to be carried out in WG. Therefore, if it is updated to “Network-controlled repeaters are transparent to UEs and do not have to decode **at least the dedicated** forwarded data.”, we are ok. We are also ok to keep current wording as it allows such interpretation.

23 – NEC Corporation

We support all four points and views of OPPO and Qualcomm on the interpretation of awareness of forwarded data.

24 – CEWIT

Support all four points.

25 – Verizon UK Ltd

Fine with the 4 points and QC’s clarification on “without awareness of forwarded data”

26 – Beijing Xiaomi Mobile Software

We support all these 4 points and also support QC’s clarification.

27 – ITRI

We support all these 4 points and also QC’s clarification.

28 – Spreadtrum Communications

Support all these 4 bullet and also fine with QC’s update

29 – vivo Mobile Communication Co.

Regarding “without awareness of forwarded data”, we think it is more clear to say “without decoding of the forwarded data”.

30 – IIT Kanpur

We support all the 4 bullets.

On the clarification of “without awareness of forwarded data”, we prefer to change it to “without awareness of the content of forwarded data” as mentioned in the clarification by OPPO and ZTE as it gives proper clarity and requires least change on the proposed bullet point

31 – Rakuten Mobile

We agree with the proposed 4 bullets.

32 – III

We support the 4 bullets.

33 – Kyocera Corporation

We support all the 4 points, while we have similar view as OPPO. The assumptions can be placed in the objective part. Regarding “*without awareness of forwarded data*”, we think it means the NCR is not aware of the content of forwarded data.

34 – CITC

we support all 4 points and QC’s update on the 3rd one.

35 – BT plc

We agree with the 4 points and are okay with Qualcomm’s clarification.

36 – Lenovo (Beijing) Ltd

We support all the 4 points and also prefer QC’s clarification.

37 – Sony Group Corporation

We support all four bullets. Regarding the third bullet we are fine with either the original formulation or QC’s.

38 – Nokia Italy

We are ok with Qualcomm’s proposed revision regarding NCR transparency.

39 – Ericsson LM

We would like to clarify and add a bullet: “There is no support for mobility of the NCR”.

We would also prefer not mentioning “awareness of forwarded data”, as the concept of data forwarding is not applicable to an NCR. That sentence could be reworded as, e.g., “NCRs are only expected to decode their own dedicated information and are transparent to UEs.”

FR1 should be down prioritized. RAN1 did not study FR1 and the complexity of NCR in FR1 is not well understood (e.g., beamforming in FR1), considering the proposed limited time for the normative phase. FR1 does not need to be explicitly excluded but should be limited to functionality from FR2 operation. Furthermore, the main benefits with NCR are likely to be found in FR2.

40 – Fujitsu Limited

Let us update our view (#16) a bit. Regarding “*and without awareness of forwarded data.*”, we should be careful to avoid any confusion. We should ensure that it is assumed that NCR is not capable of decoding forwarded signal in this WI, and this should be clarified in the WID. This can be further discussed on the good wording in the next round.

2.2 Scope on side control information design and signalling

As captured in [4], the following conclusion and recommendation on the side control information have been achieved in RAN1:

- RAN1 has studied the side control information for NCR with corresponding signalling (including its configuration). The SI phase is completed in RAN1 and the following are recommended to be specified as part of Rel-18 NCR WI from RAN1’s perspective:
 - Beam information as side control information
 - ON-OFF information as side control information
 - UL-DL TDD configuration and NCR’s behaviour over flexible symbols.

To specify the identified side control information, the aspects including detailed design of the indication and signaling, configuration of the signalling along with control plane procedures should be considered as part of objectives in Rel-18 NCR WI.

- *Specify the signalling for indication and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]*
 - *Beamforming*
 - *UL-DL TDD operation*
 - *ON-OFF for efficient interference management and improved energy efficiency*
- *Specify control plane signalling and procedures [RAN2]*
 - *The configuration of signalling for side control information indication*

- o NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed

To collect the views on this aspect, companies are encouraged to provide views on Question 2-2.

Feedback Form 2: Q2-2: Any views on the above objectives on side control information as proposed in RP-222437?

<p>1 – OPPO</p> <p>It seems that the "signalling for indication" is used by quite some people, especially in RAN1, to refer to dynamic L1 control signalling, e.g. PDCCH. But so far it is still pending at least from TR perspective whether some of side control information should be eventually dynamic or semi-static. So to avoid confusion, we suggest to remove "for indication", and to just say "<i>Specify the signalling for indication and behavior of ...</i>"</p>
<p>2 – Deutsche Telekom AG</p> <p>As indicated today in the GTW, we think that semi-static power control shall be added as part of the side control information. As an operator we think that it is absolutely important to have a control concept for the power setting in order to configure the NCR correctly based on the network planning.</p>
<p>3 – Qualcomm Incorporated</p> <p>We support these objectives. We agree with DT that power control should be further discussed during the normative phase. This should be included under the above bullets. See also Q2-3.</p>
<p>4 – Apple France</p> <p>We support the objectives based on SI's recommendation. Regarding power control, we are open to consider it further during normative phase.</p>
<p>5 – CableLabs</p> <p>Support these objectives and agree with DT comment on semi-static power control.</p>
<p>6 – CATT</p> <p>For power control, we think we should respect the TR recommendation (Power Control is not recommended) which is the result of extensive discussion. To accommodate some operator's interest, we are OK with DT's comment to add semi-static power control, but the WID should be clear that this is the only addition (dynamic power control is out of the scope).</p>
<p>7 – NTT DOCOMO INC.</p> <p>We support that objective includes beamforming, TDD operation, and On-Off. In our understanding, using the signaling via side control information for UL-DL TDD operation is FFS, so that RAN1 will discuss and downselect from three options in WI phase. If the proposal captures this point, we are fine, and if not, we prefer to say "Specify the NCR's behavior for UL-DL TDD operation".</p>
<p>8 – Futurewei Technologies</p> <p>We also support to include power control in normative work. Whether it is semi-static only or can also be dynamic, it can be decided in the WGs.</p>

9 – Intel China Ltd.

We're generally fine with the objectives above.

Regarding the working group for 'The configuration of signaling for side control information indication' under 2nd bullet, in our view, RAN1 involvement is also expected, e.g., whether/how to configure PUC-CH/UCI for HARQ-ACK or CSI is to be discussed by RAN1. So, we'd like to clarify, whether '*Specify the signalling for indication and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]*' is expected to cover such work, or '*Specify control plane signalling and procedures [RAN2]*' is to cover it? If it is the latter, RAN1 should be add as 2nd WG.

10 – China Telecommunication Corp.

Generally fine with the objectives.

11 – Samsung Electronics Co.

As we mentioned in GTW, we should rely on the discussion in SI. RAN1 already agreed not to support power control as dynamic side control information. Also as Docomo mentioned, we support to keep same wording used in TR. We think no necessary to add "*efficient interference management and improved energy efficiency*".

12 – InterDigital

We are ok with the objectives.

13 – KDDI Corporation

We are fine with the current objectives.

14 – NICT

We support the objectives.

15 – China Mobile Com. Corporation

We support the objectives listed above.

For the 2nd bullet of the control plane signalling and procedures, our thinking is that RAN1 could be the secondary group involved in this activity. At least the necessary configurations could refer to RAN1's discussion about the side control information.

As commented during the GTW, we support to introduce power control at least for the backhaul link in uplink, which will facilitate the multiplexing of normal UE and BH transmission. A semi-static power control could be used to compensate the pathloss and enable the multiplexing.

16 – Fujitsu Limited

We are generally fine with the objective proposed by the moderator. As for power control, as discussed in Monday GTW, we believe this is a useful feature for the real operation and hence operators' opinion is very imporant. Semi-static power control would be a good compromise in Rel-17.

17 – HuaWei Technologies Co.

We are in general fine with this, but regarding signaling and procedures, this was studied in RAN1 and in the normative work phase, there is also need to coordinate between RAN1 and RAN2 on the exact parameters. As commented above, it is unclear how the beam management part can be applicable for FR1, from our observation in RAN1 study this seems only obtaining gains for FR2 only.

In addition the above two bullets are somehow duplicating and perhaps the cleaner way is to merge these two as below:

*Specify the signaling, **and its configuration**, for indication and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]*

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF for efficient interference management and improved energy efficiency*

Specify control plane signalling and procedures [RAN2]

- *The configuration of signalling for side control information indication*
- *NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed*

18 – ZTE Corporation

We are fine with the proposed objectives.

Regarding the 2nd objection, as mentioned in our motivation paper, some other supplementary procedures are also needed to be discussed in RAN2, and for the relevant working group of the 2nd proposal, we are fine to add the RAN1 also considering the potential actions.

19 – AT&T GNS Belgium SPRL

We support the objectives proposed by the moderator. Additionally for side control information, although there was no consensus in the SI phase and conclusions of the TR, semi-static PC may be reasonable to include as part of the objectives for the WI phase.

20 – Panasonic Corporation

As we comment to next question, we think semi-static power control aspect should be added.

21 – NEC Corporation

We support in general. And agree to add power control as it's referred by DT.

22 – KT Corp.

KT agrees with moderator's proposal and we are OK to add power control in the scope if work can be done without increasing too much time budget.

<p>23 – CEWiT</p> <p>Support the proposal in general. Regarding power control, we support adding in WID. Regarding the second bullet, we share a similar view with Intel China, the involvement of RAN1 is necessary.</p>
<p>24 – Verizon UK Ltd</p> <p>Generally fine with the proposal</p>
<p>25 – Spreadtrum Communications</p> <p>We support the objectives</p>
<p>26 – ITRI</p> <p>We are fine with the proposal. Also we agree to add power control as referred by DT.</p>
<p>27 – vivo Mobile Communication Co.</p> <p>We also support power control, which is beneficial for maintaining the coverage of gNB and coverage of NCR. Based on RAN1 discussion, many companies have interest on power control, including some operators, we think we should respect the operator’s requirement and support power control as additional feature.</p> <p>For the signaling and procedure, we think RAN1 should be included as well, the configuration of side control information needs RAN1 design as well.</p>
<p>28 – LG Electronics Inc.</p> <p>We are reluctant to add power control in the objective considering the limited TU. We want to respect TR recommendation, i.e. “Power Control is not recommended”.</p>
<p>29 – Rakuten Mobile</p> <p>We are fine with the proposed text. Regarding TPC feature, as we commented in GTW session, we are fine to include it, if the community can be converged about the necessity. We don’t prefer to have WG level discussion about necessity to save time budget.</p>
<p>30 – IIT Kanpur</p> <p>We support the proposal in general. And agree to add power control. For the second bullet regarding signalling and procedures, we think RAN1 should be included as well.</p>
<p>31 – III</p> <p>We support the objectives.</p>
<p>32 – Kyocera Corporation</p> <p>We agree with OPPO’s rewording. In addition, we think the specification should allow multiple NCR-Fwds, so we suggest to reword to “<i>Specify the signalling for indication and behavior of the following side control information for controlling theeach NCR-Fwd</i>”</p>

<p>33 – CITC</p> <p>we are fine with the objectives.</p>
<p>34 – BT plc</p> <p>We are fine with the objectives and agree with DT for the inclusion of semi-static power control.</p>
<p>35 – Lenovo (Beijing) Ltd</p> <p>We support beamforming, TDD configuration and on-off. Besides, we also support power control for interference management and prefer it to be captured in WID.</p>
<p>36 – Sony Group Corporation</p> <p>We support the current objectives. We are hesitant to include power control among the objectives, since TUs are very limited.</p>
<p>37 – Nokia Italy</p> <p>Given the lack of consensus on other side control information, we would prefer to prioritize the recommendations made by RAN1 in the agreed TR. We may be open to considering semi-static signaling for power control configuration, but note there are still some configuration options recommended in the TR that consider the use of OAM or hard-coding to configure and feel that those options should not be excluded at this time.</p>
<p>38 – Ericsson LM</p> <p>We agree with the proposed objectives.</p>
<p>39 – Fujitsu Limited</p> <p>Let me update previous comment (#16)</p> <p>Signalling for indication is not always required for the NCR functionalities, i.e. TDD config is one example, according to RAN1 agreements, but current sentence looks as it is allowed. Therefore we would propose to modify <i>”Specify the signalling for indication, <u>if necessary</u>, and ...”</i></p> <p>We are also OK to remove <i>”efficient interference management and improved energy efficiency”</i> as mentioned by other companies in order to give the same level description as other bullets.</p>
<p>40 – Fujitsu Limited</p> <p>and, as for <i>”Specify control plane signalling and procedures”</i>, we agree with other companies that RAN1 should be included as a secondary group</p>

Moreover, it's discussed in some contributions to further include some other side control information, e.g., power control, as part of scope. To collect views on this aspect, companies are encouraged to provide views

on Question 2-3.

Feedback Form 3: Q2-3: In addition to the proposed scope on side control information and signalling, are there any other aspects that should be included in the scope for normative phase? If so, please provide your views.

1 – Pivotal Commware

Pivotal Commware:

This is our view on Power Control:

It is reasonable to establish max TRP or EIRP in each of the NCR-FWD repeater directions (access and backhaul), and this way give operators control to choose what is suitable for their network. We consider these simple static parameters, and no need to conduct it via side control info.

On the other hand, for either semi-static or dynamic power control:

We have provided simple examples in our paper in RAN1 110 (R1-2205813) that illustrate that NCR itself is in the most-informed position to employ its algorithms (that work on a slow and fast time scale) to adjust and control its power. We think "run-time" PC is the best left to NCR's own functionality, that can be further policed in RAN4 work (checks for oscillation, interference and power caps).

2 – OPPO

Given the specification already has dynamic power control for each UE, it does not make much sense to setup another dynamic power control mechanism which somehow manipulates the "pathloss" between gNB and UE. We are open to discuss the semi-static power control in NCR. Meanwhile, if power control is eventually considered as one side control information, we would like to get a clarification whether ON-OFF information is still needed, since OFF simply equals to zero power from air-interface point of view.

3 – Deutsche Telekom AG

Power Control side information shall be added, see our comment to the above question ..

4 – Qualcomm Incorporated

There are several companies in support of power control or to at least further discuss power control for NCR. For that reason, we believe that the discussion on power control should be continued during the normative phase. This should be captured in the WID, e.g.:

Specify the signalling for indication and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF for efficient interference*
- *Discussion on support of power control information*

5 – CableLabs

Agree with QCM's proposal

6 – CATT

If power control is added we should clearly indicate 'discussion on support of semi-static power control'

7 – NTT DOCOMO INC.

For the power control, considering the situation of the discussion and limited TU for WI phase, we think it's difficult to include.

8 – Futurewei Technologies

We also support to include power control in normative work. Whether it is semi-static only or can also be dynamic, it can be decided in the WGs.

9 – Intel China Ltd.

Power control had been discussed in SI without any consensus (e.g., whether to support power control, only DL or UL or both, semi-static or dynamic). It would be a challenge to include power control in WI phase with limited TU.

Regarding the semi-static power control based on network planning suggested by operators, we share similar view with Pivotal Commware that it can be achieved without side control information.

10 – Samsung Electronics Co.

As comment, we do not want to add dynamic power control such as using side control information. In addition, to our best knowledge about repeater implementation, our understanding is same as Pivotal Commware about power control implementation.

11 – KDDI Corporation

We prefer to limit the work to semi-static power control.

12 – China Mobile Com. Corporation

As commented during the GTW, we support to introduce power control at least for the backhaul link in uplink, which will facilitate the multiplexing of normal UE and BH transmission. A semi-static power control could be used to compensate the pathloss and enable the multiplexing.

We share the similar idea that power control for efficient interference management could be complicated. Current limited TU cannot support such activities. But a specified NCR power control procedure to compensate the pathloss is more straightforward and current procedure could be reused. The standardized power control procedure could facilitate the interaction between gNB and NCR which may be from different vendors.

13 – Fujitsu Limited

As mentined in the pervious section, we think power control can be included in the scope depending on the operators' interest , and semi-static control would be a good compromise in Rel-17.

14 – HuaWei Technologies Co.

We are open to consider this if operators have interest.

15 – ZTE Corporation

For the power control part, we are open to discussing it if there are strong interests. And in our view, semi-static power control can be one compromise for the normative phase. And similar to the SID, it should be the 2nd priority and only for the backhaul link.

16 – AT&T GNS Belgium SPRL

If there is consensus to include PC information as part of side control, RAN1 could further study it in the normative phase and have a RAN checkpoint to further evaluate this objective, with the scope limited to semi-static power control. However, based on the SI phase discussion, we agree with some of the RAN1 tdocs that suggest that the NCR itself is in the most-informed position to employ any dynamic power control whilst still avoiding, e.g., interference issues.

17 – Telstra Corporation Limited

We support the addition of semi-static power control

18 – Panasonic Corporation

For power control, our view is at least to support semi-static target setting of Tx power of NCR-Fwd to manage NCR well from the network. It means to set max TRP or EIPR as said by Pivotal Commware. We also agree further that "run-time" PC mainly to prevent for oscillation shall be carried out within NCR. It works to reduce the power than semi-statically configured Tx power. The situation of power setting needs to be known to the gNB. Therefore, some kind of power reporting like power head room reporting would be also necessary. Dynamic power control is not required to be supported.

19 – NEC Corporation

As comment for Q2-2, we think power control information should be included.
And in additional, even with the limitation of in-band NCR, band indication or carrier indication for forwarding should be included to reduce the interference by considering the forwarding bandwidth is far larger than that for communication of NCR-MT.

20 – KT Corp.

As indicated in Q2-2, we would like to add power control if time is allowed.

21 – CEWiT

Power Control as side control information shall be added. Support the QCM's proposal

<p>22 – Verizon UK Ltd</p> <p>We also have some concerns about committing to dynamic power control without careful study as it deviates from how repeater operates today and may potentially complicate gNB power control of UE. If there is a majority wanting power control, we think we should limit it to semi-static, as a safer solution.</p>
<p>23 – Spreadtrum Communications</p> <p>We agree with the current objectives</p>
<p>24 – ITRI</p> <p>We agree with QCM’s proposal.</p>
<p>25 – vivo Mobile Communication Co.</p> <p>We think Power Control side information shall be added. See our comment to Q2.2</p>
<p>26 – LG Electronics Inc.</p> <p>We are reluctant to add power control in the objective considering the limited TU. We want to respect TR recommendation, i.e. “Power Control is not recommended”.</p>
<p>27 – Rakuten Mobile</p> <p>If Power control feature is agreeable, semi-static control is preferred.</p>
<p>28 – III</p> <p>Support QCM’s proposal.</p>
<p>29 – Kyocera Corporation</p> <p>We support at least the semi-static power control for NCR. In this case, we think the specification should be clear whether the NCR could override the gNB-UE power control.</p>
<p>30 – CITC</p> <p>we support adding power control and are fine with the scope limited to semi-static power control.</p>
<p>31 – BT plc</p> <p>We also support the inclusion of power control.</p>
<p>32 – Lenovo (Beijing) Ltd</p> <p>We support power control for interference management and improved network efficiency. We don’t think relying on OAM/network planning/setting a power amplifying gain is sufficient especially at FR2 .</p>

33 – Sony Group Corporation

We have similar views to those of Pivotal and Intel China and are therefore not supportive of adding power control to the WI objectives. With only three RAN1 meetings to go and considering that consensus on TPC could not be reached during the SI phase, it does not seem that there is enough time to treat this feature during the WI phase.

34 – Nokia Italy

We share Sony's concern regarding the available time for discussion of power control, especially given the lack of consensus from the SI phase discussion. The conclusions of the TR seem a strong indication that it is unlikely progress can be easily made on the topic of power control, and our preference would be to exclude it.

35 – Ericsson LM

Unless the purpose and technical need of power control can be agreed, there is little use in including it. During the SI, RAN1 was not able to agree even on the purpose and consequently also not on any PC specification. We consider PC beneficial for self-oscillation mitigation and are happy to agree on that but apart from that we do not think repeaters should provide enhanced functionality compared to normal gNBs.

A need of power control arising from network planning should be feasible over OAM. Semi-static (or dynamic) signalling is not needed for that.

Equally important as adding the repeater functionality in the specification work is to ascertain that no existing functionality is broken. By giving leeway to the NCR to perform PC, in parallel to gNB-UE PC loops, we increase that risk significantly. There is already little time for NCR, we should focus on necessities.

2.3 Scope on repeater management

As captured in [4], the following conclusion and recommendation on repeater management have been achieved in RAN2 and RAN3:

- Based on RAN3 analysis, the 4 candidate solutions may be further discussed pending confirmation from SA3 and SA5. With the captured content in TR38.867, RAN3 believe the SI phase is completed.
- Based on RAN2 analysis, early identification (via Msg1 or Msg3) for NCR is not needed. From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3 in potential WI. With the captured content in TR38.867, RAN2 believe the SI phase is completed. Down selection of all captured solutions may take place in potential WI phase based on the feedback from other groups.

Then, to specify the mechanism for repeater management, the solution design with potential down-selection of the 4 candidate solutions captured in the TR should be considered as part of objectives of R18 NCR WI.

- *Specify the solution of network-controlled repeater management [RAN3,RAN2]*

- *NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed based on the feedback of other working groups (e.g., SA3, SA5).*

To collect views on this aspect, companies are encouraged to provide views on Question 2-4.

Feedback Form 4: Q2-4: Any views on the above objective on repeater management?

1 – Deutsche Telekom AG

Seeing the extensive discussion in the RAN WGs on the question resulting in 4 different options and the fact that 2 require more interaction with SA3/5 and the fact that operators requirement should be used as main guidance we propose to downselect the option space at this RAN plenary.

The Option 2 can be clearly excluded as this option is not interoperable, hence we can dismiss this directly.

We see only the option 3 ("IAB-like") as an feasible option for any mobile operator. The commonality with IAB for a NCR deployment seemes to provide a clear management benefit (by reusing the same / similar system).

Hence we propose to exclude all options except option 3 and task the WG in the WI to only realise this option.

2 – Qualcomm Incorporated

As the TR states, Solution 2 does not provide inter-vendor interoperability. Solution 2 is therefore out-of-scope. RAN WGs should not spend time discussing single vendor solutions.

It is further not clear, which other WGs need to be involved for the down selection apart from SA3 and SA5. It would be preferable to only refer to these WGs.

The down-selection should not be (solely) based on feedback from SA3 and SA5, but it should include their feedback.

We propose the following rewording:

NOTE: Down-selection of solutions 1, 3 and 4 in section 8 of TR 38.867 is needed including feedback by SA3 and SA5.

3 – Apple France

We would prefer that the down-selection can be done in WG in normative phase after getting feedback from SA WGs. There is no need to discuss the down-selection in the plenary

4 – CATT

agree with some other companies that the down-selection can be done in WG in normative phase .

5 – Futurewei Technologies

So far options has all support and no issue, we suggest to start the WI with option 3.

6 – Intel China Ltd.

We're general fine with above objectives.

Regarding other working groups, solutions 3 and 4 also impact SA and CT groups as they need to update their specifications. Hence, in Note, we'd prefer mention SA and CT groups in general or not mention any groups specifically.

We propose to update it as follows

NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed based on the feedback of other working groups (e.g., SA3, SA5).

7 – KT Corp.

While KT agree with the need of down selection, we would prefer to have 4 identified solutions to be discussed in WGs during the incoming WG meetings and come back in December for the final down selection of solutions.

8 – Samsung Electronics Co.

We can add more specific meaning of management

- *Specify the solution of network-controlled repeater management (the identification and authorization/-validation of NCR) [RAN3,RAN2]*

9 – KDDI Corporation

We also agree that the down-selection can be done in WG in normative phase.

10 – MediaTek Inc.

We also agree that down-selection should be done in WG discussions.

11 – Fujitsu Limited

Our preference is to keep the 4 solutions right now and to perform down selection in WGs.

12 – HuaWei Technologies Co.

We don't see need to specify so many solutions and agree to have down selection. As solution 3 and 4 do not introduce security risks, we could start from these two solutions for down selection. From our side solution 3 is preferred which is the same solution as IAB and already specified. For solution 1 and 2, the feasibility still needs to wait till SA3 and SA5's feedback and it does not make sense to repeat the discussion and waste time in Q4 in RAN2/RAN3 on these two solutions. Therefore we think we either only focus on solutions 3/4 in Q4 in RAN2 and RAN3, or we postpone the WID with this objective to December plenary, as this is not urgent anyway considering SA5 meeting will be in November. We cannot accept discussing all 4 solutions in Q4 in RAN2 and RAN3.

13 – ZTE Corporation

We are fine with the proposed objective.

Regarding the down-selection, we are not convinced to conduct the down-selection in plenary, especially considering recommendations in WGs.

14 – Telstra Corporation Limited

In principle, we believe NCR management should be core network controlled and Telstra has a strong leaning toward solution 3. We agree with Qualcomm that solutions that do not permit inter-vendor interoperability should not be considered further. Such solutions do nothing to grow the global equipment ecosystem.

Should it be decided that further working group discussion is needed for downscoping, guided by responses from SA working groups, then a final decision on the downscoping should be presented for approval in RAN#98e.

15 – AT&T GNS Belgium SPRL

We agree with the general thought that the WGs should discuss down-selection for technical decisions in the normative phase in the spirit of the TR conclusion. However, in this case it is quite clear that option 2 is out of scope and as such, we support modifying the objective as follows, similar to the QCOM proposal and also clarifies "management":

*Specify the solution of network-controlled repeater management (**i.e., identification, authorization**) [RAN3,RAN2]*

*NOTE: Down-selection of solutions **1, 3 and 4** in section 8 of TR 38.867 is needed **taking into consideration** feedback of other working groups (e.g., SA3, SA5).*

16 – NEC Corporation

Basically we are fine with the objectives.

We prefer to do down-selection in WG in normative phase.

17 – Verizon UK Ltd

Prefer to keep the objectives now and do down-selection in WGs in normative phase

18 – Spreadtrum Communications

We are fine with the proposed objectives. Down-selection should be done in WGs.

19 – ITRI

We also agree that down-selection should be done in WG discussions.

20 – vivo Mobile Communication Co.

We also agree that down-selection can be done in WG phase discussions.

21 – LG Electronics Inc.

Considering the limited TU in RAN2 (0.5), it is not feasible to discuss all 4 solutions in WG. Thus, we prefer to down-scope the solution in RAN plenary.

We think at least the solution 1 and 2 can be excluded in RAN plenary.

22 – China Telecommunication Corp.

We prefer to keep the 4 solutions and make down selection in WG discussions. Since the feasibility of NCR validation procedure in solution 1 and 2 will be decided by SA3, we don't think it is proper to preclude these two solutions at this stage.

23 – Rakuten Mobile

We are fine with the proposed text.

24 – III

We agree the down-selection can be done in WG normative phase.

25 – Kyocera Corporation

We agree with the moderator's wording and think the down-selection should be done in WGs based on feedback from SA WGs.

26 – CITC

We prefer to do the down-selection in WG discussions.

27 – BT plc

We are fine with the proposed text. The down-selection can be done in the WG in the normative phase after receiving feedback from SA3/SA5.

28 – Lenovo (Beijing) Ltd

We are fine to perform down selection in the WI phase including feedback from other groups.

29 – Sony Group Corporation

We think RAN2/3 can not work on solution details for solution 1 and 2 unless there is a response from SA3. So, some guidance from RANP is needed.

30 – Nokia Italy

As expressed by many, in our view it would be beneficial that RAN down-selects a solution for NCR identification and authorization among the solutions, which are feasible from the security perspective without further work from SA3 or SA5 i.e. among the solutions 3 and 4. Our preference is the solution 3, which is already used for IAB.

If the down-selection cannot be agreed in RAN#97e, then the objectives should be clarified further. SA3 feedback and decision is only needed for the solutions 1 and 2, not for the solutions 3 and 4. This should be made clear in the objective text e.g. as follows (Objectives updates below are made on top of AT&T's update proposal):

Specify the solution of network-controlled repeater management (i.e., identification, authorization) [RAN3, RAN2]

*NOTE: Down-selection of solutions 1, 3 and 4 in section 8 of TR 38.867 is needed **taking into consideration** feedback of other working groups (e.g., SA3, SA5). **The solution 1 can only be considered for down-selection if SA3 confirms the feasibility of the solution 1 from the security perspective.***

If the solution 2 is still considered further, the above-mentioned text for SA3 first needing to confirm the feasibility from the security perspective applies to the solution 2 as well.

31 – Ericsson LM

We think it is sensible to reduce the number of options at this stage, if agreeable, and continue discussing the technical details in the WGs (see our paper, RP-222310, which also mentions the comparison table as a reference). We would like to point out that a rogue UE posing as an NCR could in principle “jam” an entire cell, so secure authorization from the CN seems needed. Solutions 3 and 4 fulfil this requirement and reuse legacy mechanisms. We also note that solutions 3 and 4 are very similar, so at least at this level they should be considered together (and further down-selection should be left to RAN3).

32 – China Mobile Com. Corporation

We agree with the objective as it is. We should respect the SI conclusion captured in the TR 38.867 “Down selection of all captured solutions may take place in potential WI phase based on the feedback from other groups”.

If companies have strong opinion to do down-selection now, CMCC prefers option 1 and option 2. From our view, the slice related example in option 1 is not necessary and can be removed. Further details for option 1/2 can continue be discussed in the normative phase, since we only have one meeting SI phase in RAN2 and RAN3.

As operator, CMCC have strong preference for the solution without any impact to core network. The repeater is considered as a RF layer relay (different from L2/L3 relay), which is expected to be quickly deployed whenever a coverage hole is detected. Upgrading core network for the repeater causes unnecessary time and cost. Therefore, this will seriously affect the progress of large-scale commercial deployment for NCR.

2.4 Scope on the RAN4 part of NCR

According to the identified scope of side control design along with the model of NCR, the following RAN4 related aspects are also needed to be considered as part of scope of R18 NCR including RF (e.g., the impacts to enable the dynamic beamforming, ON-OFF requirement and the RF requirement for NCR-MT), RRM (i.e., RRM requirement for NCR-MT) and demod requirement (i.e., requirement for NCR-MT to verify its baseband performance and capability).

– Core part:

- *Specify the RF and EMC requirements [RAN4]*
- *Specify the RRM requirements of NCR [RAN4]*

– **Perf part:**

- *Define the RF conformance testing requirements and EMC requirements of NCR [RAN4]*
- *Define the RRM performance requirements of NCR [RAN4]*
- *Define the demodulation performance requirements for C-link of NCR, if necessary [RAN4]*

To collect views on this aspect, companies are encouraged to provide views on Question 2-6.

Feedback Form 5: Q2-6: Any views on the above objectives on NCR from RAN4 perspective.

1 – OPPO

For the 1st bullet under "Core part", we believe the intention is to specify the RF/EMC requirements for the NCR, instead of including the normal UE connecting to the NCR. So we prefer to make it clear by the following modification:

- *Specify the RF and EMC requirements of NCR [RAN4]*

2 – Ericsson LM

- **On RRM objective:** Proponent should clarify what is the RRM impact on core and performance. Being network node, in our RRM requirements are not needed unless there is specific reason/feature. In any case we should be very specific on RRM objective. If it is not clear at this stage then such objective can be added later once the impact is known e.g. based on agreements in other WGs. We would like to avoid such broad objective: Define the RRM performance requirements of NCR. Otherwise this will consume lot of RAN4 time.
- **On demodulation objective:** How the NCR will be configured depends on the agreements in other WGs. For example if this is done via SI (e.g. SIB1) then demodulation is not needed because such requirements are not testable and no such requirements exist even for the UE. Therefore, at this stage it is better to remove the objective on the demodulation. If needed based on other WGs agreements, the objective can be added at that stage.

3 – Samsung Electronics Co.

Based on the potential objectives on RAN1, RF/RRM/Demod performance requirements are required from RAN4 perspective. Existing requirements specified for RF repeater and IAB can be used as starting point to further develop additional requirements for NCR. In general, we are ok with current proposed RAN4 objectives with below comments:

- Regarding "EMC requirements" objective not clear for us what's the additional effort required besides of existing EMC requirements specified for RF repeater?
- In the proposed WID RP-222437 section 5 "Impacted existing TS/TR":
 - TS 38.106 shall also be considered for perf part to include demodulation performance requirements.
 - Which specification will be used to specify RRM requirements, TS 38.133?

4 – ZTE Corporation

Regarding the RAN4 part, as we highlighted in the motivation paper, we still need to define some RRM requirements for NCR-MT to ensure the performance of the control link between NCR-MT and parent gNB. We can start with the following cases to define the RRM requirement including 1) RRC Connection Mobility Control (RRC re-establishment, Random access, RRC release with redirection); 2) RLM; 3) Link recovery procedure; 4) NCR-MT timing requirements.

In general, the detailed RRM requirement could be discussed further at the WG level.

For the modulation part, in SI, we already agreed that some indication will be done by both semi-static and dynamic signaling, which means that support of PDSCH/PDCCH is expected.

Regarding the questions from Samsung, in our view, both demod and RRM requirement for NCR-MT could be kept in 38.106, which is dedicated to the repeater.

5 – HuaWei Technologies Co.

It is unclear why existing RAN4 requirements cannot be reused, and the different aspects compared with existing ones are ambiguous. In addition NCR is stationary and therefore not clear what exact RRM requirements are really needed. The functionality of demodulation has never been discussed before and it is unclear whether it is feasible for the NCR to support such a function, and it is too early to say there is a need to define demodulation performance requirements. Actually when discussing Rel-18 TUs, it was assumed there should be no impact on RAN4 and thus no TU was allocated to this topic. In summary, we think the RAN4 objectives should be changed as below:

Core part:

- To study and Specify the RF and EMC requirements if needed [RAN4]
- To study the RRM functions to be supported and Specify the RRM requirements of NCR if needed [RAN4]

Note: whether the existing requirements defined in RAN4 can be reused shall be investigated.

Perf part:

- To study and Define the RF conformance testing requirements and EMC requirements of NCR if needed [RAN4]
- To study the RRM functions to be supported and Define the RRM performance requirements of NCR if needed [RAN4]

Note: whether the existing performance requirements defined in RAN4 can be reused shall be investigated.

- To study the feasibility of supporting demodulation for C-link of NCR [RAN4]

6 – E-surfing Digital

China Telecom:

We support the proposed RAN4 core and performance objectives based on the RAN1/2 objectives for the WI.

7 – Kyocera Corporation

We're fine with OPPO's rewording.

8 – AT&T GNS Belgium SPRL

We are OK with the proposed objectives of the RAN4 part. We also support the Samsung comment that existing requirements specified for RF repeater and IAB can be used as starting point to further develop additional requirements for NCR. This aspect could be captured in the WID.

9 – Intel China Ltd.

In our view, the work needs to start first with a discussion of whether anything, e.g., new requirements or existing RF repeater specification update (TS 38.106, TS 38.115-1, TS 38.115-2) is needed at all. Therefore, 'if needed' should be added at least for the bullets for Core part.

10 – Nokia Italy

Agree that the existing requirements specified for NR repeater and relevant requirements for IAB could be considered as baseline, and are supportive of Huawei's view that effort should be made to determine if new requirements are necessary.

11 – Ericsson LM

We also agree with Huawei and Intel that RAN4 need to first check if the RF requirements are needed.

Our suggested wording for the RF core and performance part objectives is:

Study the impact on RF and EMC requirements based on the outcome of the RAN1/RAN2 specification:

- *Specification of RF and EMC requirements (if needed) depends on the outcome of the study.*

12 – Qualcomm Incorporated

We agree with Huawei's rewording.

2.5 Required TUs for Rel-18 NR NCR WI

According to the endorsed plan for Rel-18 package, the TUs for NCR in normative phase have been reserved for RAN1, RAN2 and RAN3. Meanwhile, based on the progress of NCR, further refinement on RAN4's TU package is also expected according to the clarification in previous RAN meeting. Then, with above consideration including the identified scope for all groups, the initial TU sheet is proposed in [5]. To collect views on this aspect, companies are encouraged to provide views on Question 2-7.

Feedback Form 6: Q2-7: Any views on the proposed TU sheet in RP-222437**1 – Qualcomm Incorporated**

TUs for RAN2/RAN3 should not start before November so that SA3/SA5 have time to respond to the LS.

2 – HuaWei Technologies Co.

As SA5 meeting is in November, we don't think there should be TU allocated for Q4 in case companies want to have down selection among 4 solutions, this shall be then comeback to Decemember plenary. For TUs for other WGs, it also depends on the finalized scoping and a bit premature to decide now.

3 – ZTE Corporation

For the TU part, we prefer to stick with the existing plan for RAN1, RAN2, and RAN3.

Regarding the RAN1 part, the scope is clear that we need to initialize the discussion following the progress and recommendation in SI. For RAN2, except for the repeater management, there are still other aspects mentioned in the scope (e.g., signaling and control plane procedure) for discussion. For the RAN3 part, according to the meeting plan in SA, the response from SA3 is still possible and we can try to treat this issue earlier.

4 – NEC Corporation

We think RAN2/3 can start from Oct.meeting, with focusing on solutions without security concerns, i.e., solution 1 (without optional NCR validation procedure), solution 3 and 4.

5 – Intel China Ltd.

We're fine with the proposed TU, to start RAN2/3 work from Oct. meeting.

6 – CITC

We support the existing working plan.

7 – Sony Group Corporation

We think RAN2/3 should focus on other tasks than identification and authorisation during 3Q.

8 – Nokia Italy

In our view RAN3 and RAN2 can only start work on solution 3 and 4 for NCR identification and authorization in their October meetings, as they are feasible from the security perspective and do not require feedback and decisions from SA3 and SA5 first.

9 – Ericsson LM

We think three meetings [5] are a bit optimistic, considering RAN2 and RAN3 proposed to work in parallel to RAN1, essentially implying that RAN1 signalling should be finished after the second meeting.

RAN2 (and maybe RAN3) should start working after RAN1 has concluded its work. Especially RAN2 should not do the work in parallel.

2.6 Moderator's observations and proposals

2.6.1 Observation and proposal for scenarios and assumptions

As observed from the feedback received, it seems that there is a clear majority to support the proposed scenarios and assumptions for NCR WI.

One company [OPPO] suggested to capture the description of scenarios/assumptions in the objective section instead of justification. It sounds reasonable from moderator's perspective.

For the question to clarify the "without awareness of forwarded data", the intention is to highlight that no processing on the forwarded data dedicated for/from the UE via NCR is expected by NCR, which is also aligned with the comments from one company [Panasonic] for the common signalling shared by NCR and UEs. From moderator's perspective, it is also fine to describe what NCR is only expected to do (instead of "not to do") as [Ericsson] suggested.

Regarding [Samsung, AT&T]'s suggestions to remove the corresponding description, it may lead to additional ambiguity on NCR's behavior with some concerns as mentioned by companies.

For the applicable frequency range of NCR, one company [HW] proposed to preclude the FR1 due to the concerns on RAN4 work. However, the majority still prefers to keep the current wording and companies also highlight that the mechanism is generic for all bands.

Therefore, the moderator suggests to update the proposal as follows:

The normative work of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:

- Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867.*
- For only single hop stationary network-controlled repeaters*
- NCRs are only expected to decode their own dedicated information and are transparent to UE*
- Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

2.6.2 Observation and proposal for the scope on side control information design and signalling

As observed from the feedback received, the majority is fine with the proposed objectives regarding the side control information design and signalling.

Regarding the comments on power control, with joint consideration on Q2-2 and 2-3, it seems that the power control feature is still preferred by most of the companies including many operators. As a compromise to address the concerns from another side, it's reasonable to mark this feature as the 2nd priority with additional restriction on the application.

Regarding the proposed editorial changes on the bullet point, it's fine to incorporate in the updated version.

For the comment from one company [HW] to merge the two bullet points, it's more reasonable to keep the current wording to have clear work split among groups. It's also reasonable to add [RAN1] as the 2nd working

group for the objective to specify the control plane signalling and procedure based on the suggestion from companies.

Therefore, the moderator suggests to update the proposal as follows:

Specify the signalling ~~for indication~~ and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming*
- UL-DL TDD operation*
- ON-OFF information ~~for efficient interference management and improved energy efficiency~~*
- Semi-static power control for the backhaul link (as the 2nd priority)*

Specify control plane signalling and procedures [RAN2, RAN1]

- The configuration of signalling for side control information indication*
 - NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed*

2.6.3 Observation and proposal for the scope on repeater management

According to the feedback received, the majority is fine with the proposal but views on whether to conduct any initial down-selection in RAN plenary meeting are still diverged.

For the comment on solution-2, although some companies pointed out the potential issue on inter-vendor interoperability, there is still a strong view on keeping it. Then, we can still further check it in normative phase. Since the RAN3 LS has been sent to SA3 and SA5 on solution 2, it is more desirable to compare solutions in multiple aspects after getting the feedback from SA3 and SA5. Following some comments from the first round, we should respect the TR conclusion which clearly says “Down selection of all captured solutions may take place in potential WI phase based on the feedback from other groups.”. If there is a strong concern on this aspect, down-selection is still possible in WG level.

Regarding other comments to refine the wording by adding more specific description, it’s reasonable to incorporate it to reflect the recommendation from SI and feedback from SA3 and SA5 is needed for final decision. Therefore, the moderator suggests to update the proposal (with the wording similar to the TR conclusion) as follows:

- Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]*
 - NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed ~~based on~~ taking into the account the feedback of other working groups (e.g., SA3 and SA5). From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3.*

2.6.4 Observation and proposal for the scope on RAN4 part of NCR

As observed from the feedback, it seems that the views on RF part are aligned. For the RRM and demod requirement part, it seems that more specific description on the scope is needed, e.g., examples for RRM. Meanwhile, regarding the comment from one company on the reuse of the existing requirement, it's reasonable to reuse the legacy part if applicable. The detailed impacts (including which existing requirements should be reused) will be discussed in normative phase by following the normal procedure as in other WIs.

Therefore, the moderator suggests to update the proposal as follows:

Core part:

Study and specify the RF and EMC requirements of NCR [RAN4]

Study and specify the RRM requirements of NCR [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR [RAN4]

Study and define the RRM performance requirements of NCR [RAN4]

Study and define the demodulation performance requirements for C-link of NCR, if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

2.6.5 Observation and proposal for the scope on the required TUs

According to the feedback received, it's preferred by the majority to follow the existing TU allocation for RAN1/2/3.

Regarding on the comment to postpone the discussion in RAN2/3, based on the further clarification from others, there is still work which is expected to be treated in RAN2 and RAN3 in Q4. The feedback from SA3 is also possible in Oct e-meeting according to the existing meeting schedule. Note that RAN2/3 will end later than SA3 in October e-meetings. From the moderator's perspective, it can be up to RAN WG Chairs' discretion on how to organize the discussion in Q4.

For the RAN4 part, it seems that companies' view on RAN4 related objectives are converged in the main direction, and it's reasonable to keep the current proposals.

Therefore, the moderator suggests to keep the current TU proposal for further check.

3 Intermediate round discussion on the scope of R18 NCR WI

3.1 Scenarios and assumptions for NR NCR

Please provide your views on the updated proposal based on initial round discussion.

The normative work of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:

- *Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867.*
- *For only single hop stationary network-controlled repeaters*
- *NCRs are only expected to decode their own dedicated information and are transparent to UE*
- *Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

Feedback Form 7: Q3-1: Any views on the above updated proposal for scenarios/assumptions?

1 – FirstNet

We agree with all four (4) listed bullets here and they are totally relevant to the WID.

2 – Qualcomm Incorporated

The term “*NCRs are only expected to decode their own dedicated information*” needs clarification. It is not clear whether this refers to information generated by the NCR or received by the NCR. Further, it is not clear if this may or may not include information to be forwarded between UE and network.

Instead, we may want to state that the repeater is not expected to decode information forwarded between UE and network:

“The NCR is not expected to decode information forwarded between UE and network and it is transparent to the UE.”

3 – Apple France

For the 3rd bullet, the suggestion by Qualcomm is much better. Otherwise, the proposal looks fine.

4 – Nokia Italy

Support Qualcomm’s proposed modification.

5 – AT&T GNS Belgium SPRL

We agree with the 4 bullets and also prefer the suggested modifications to the 3rd bullet as proposed by QCOM.

6 – Philips International B.V.

We much prefer Qualcomm’s wording for the third bullet. Apart from that, we support the proposal.

7 – InterDigital

We are also supportive for the Qualcomm’s modification.

8 – Samsung Electronics Co.

We are also ok with Q’s version.

9 – Panasonic Corporation

We agree Qualcomm comment that “NCRs are only expected to decode their own dedicated information” is not clear. On Qualcomm wording, common channel are excluded for the decoded by NCR in the wording. We would like to have the possibility of the discussion. Therefore, our suggestion is “The NCR is not expected to decode **dedicated** information forwarded between UE and network and it is transparent to the UE.”

10 – China Telecommunication Corp.

Generally fine with the proposal. The original wording or Qualcomm’s wording are both fine for us.

11 – Fujitsu Limited

It seems that using ‘decode’ might cause some other confusions, such as what mentioned by Panasonic.

Considering the situation, we prefer to update the original version provided by rapporteur in previous round rather than using ‘decode’, e.g.,

Network-controlled repeaters are transparent to UEs and without awareness of the content of forwarded datsignal

In RAN1, we already agreed that the gNB can indicate the beam index and the corresponding time domain resource to the NCR. The NCR-Fwd can work well without knowing the content of the forwarded signal. The NCR does not need to decode either the dedicated information for UEs or the common signal forwarded to UEs unless the NCR-MT needs the common signal as well.

<p>12 – Futurewei Technologies</p> <p>We are fine with the proposal in general. About the 3rd bullet, it should be fine to have only the part that "NCRs are transparent to the UE". Things like whether NCR decodes information dedicated to a UE is irrelevant to the NCR specification work.</p>
<p>13 – III</p> <p>We are fine with the proposals. About 3rd bullet, we prefer Futurewei's view.</p>
<p>14 – CableLabs</p> <p>Support QCM's proposal. Beside that, we are OK with the rest.</p>
<p>15 – ITRI</p> <p>We support Qualcomm's modification.</p>
<p>16 – Intel China Ltd.</p> <p>We support the proposals, but for 3rd bullet, we also think the wording from moderator is unclear. To avoid confusion caused by 'decode', we prefer Fujitsu's modification which can address concerns in 1st round discussion.</p>
<p>17 – NICT</p> <p>We prefer Fujitsu's modification to the 3rd bullet.</p>
<p>18 – NTT DOCOMO INC.</p> <p>We are fine with the proposal.</p>
<p>19 – OPPO</p> <p>For the proposal by QC, we think the wording "forwarded between UE and network" should not be interpreted as that the NCR would know which UE gets involved with such forwarding (as one big difference from IAB). At least it was not studied in SI phase to make this happen by side information. We even doubt whether the parent-gNB of NCR could reliably know which UE is served by NCR and which UE is not (maybe gNB can tell by implementation, but no specification guarantee is in place). So if RANP goes with QC proposal, we would propose to change it to "forwarded to/from gNB" to avoid any potential confusion.</p> <p>We are also ok to Fujitsu's version.</p> <p>Again, we would like to see the final bullets, especially the UE transparency one, in objective section. Thanks.</p>
<p>20 – NEC Corporation</p> <p>We are fine with the proposal.</p> <p>On the 3rd bullet, we think Futurewei's proposal is better.</p>
<p>21 – CEWiT</p> <p>Generally fine with the proposal. For third bullet support QC's modification</p>

<p>22 – LG Electronics France</p> <p>We are fine with the proposal with QC’s modification on the third bullet point</p>
<p>23 – vivo Mobile Communication Co.</p> <p>it is fine for us to modify the 3rd bullet, i.e., NCR not expected to decode the forwarded information.</p>
<p>24 – vivo Mobile Communication Co.</p> <p>it is fine for us to modify the 3rd bullet, i.e., NCR not expected to decode the forwarded information.</p>
<p>25 – vivo Mobile Communication Co.</p> <p>it is fine for us to modify the 3rd bullet, i.e., NCR not expected to decode the forwarded information.</p>
<p>26 – ZTE Corporation</p> <p>We are fine with all bullets and regarding the updates on the 3rd one, the intention behind seems aligned that the UE’s data, which is forwarded by NCR should not be touched. For other information including common control information shared by NCR-MT and UE, it’s still allowable for NCR’s operation.</p> <p>Then, in our view, let’s try to focus on the content and update the proposal as:</p> <p><i>- Network-controlled repeaters are transparent to UEs and <u>without awareness of the content of forwarded data from/to UE dedicatedly.</u></i></p>
<p>27 – HuaWei Technologies Co.</p> <p>We also think Qualcomm’s comment is better.</p> <p>Regarding whether to apply NCR to FR1, our previous comment on how to address beam correspondence for FR1 is not answered by companies, and we are not sure how to proceed forward on this aspect in both RAN1 and RAN4.</p> <p>As also commented by Ericsson in the first round, applying NCR in FR1 has not been studied thoroughly due to limited time. In particular, beam correspondence is only defined for FR2 in current specification, which is completely unclear for FR1. Extending beam correspondence to FR1 for NCR neither seems trivial nor necessary given that the expected benefit is FR2 instead of FR1. Without clear justification, we disagree to starting work on FR1.</p>
<p>28 – Samsung Electronics Co.</p> <p>We also think Q’s version is better.</p>
<p>29 – IIT Kanpur</p> <p>We support the current proposal. Also fine with the updated proposal by ZTE.</p>
<p>30 – KDDI Corporation</p> <p>We prefer Fujitsu’s modification.</p>

31 – Fujitsu Limited

‘Forwarded data’ is unclear. It seems that some RS is excluded. We think the exclusion of RS is not the original intention of this bullet. We prefer ‘forwarded signal’ which is more common.

Besides, though it is described that NCRs are transparent to UEs, the UEs are actually transparent to NCRs as well. The NCRs have no capability of identifying UEs. Hence, ‘from/to UEs’ seems unnecessary in the 3rd bullet.

32 – Lenovo (Beijing) Ltd

We slightly prefer QC’s version.

33 – CITC

China Unicom:

We are fine with the proposal by futurewei that simple ”NCRs are transparent to the UE” would be better. And we are also fine with the original wording provided by the moderator.

34 – Ericsson LM

FR1 should only be supported provided it is relying on specified FR2 behavior and no additional FR1 specific work is done. FR1 beamforming has not at all been discussed in the SI phase and should be downprioritized as a result. Allowing digital beamforming would result in a completely different repeater architecture with different requirements.

Additionally, we think that sub-band operation should also be included as agreed in the SI and captured in the TR, e.g., by adding

- *The network-controlled repeater may support independent operation in different sub-bands of the supported frequency band.*

Furthermore, QC’s proposed modification: “The NCR is not expected to decode information forwarded between UE and network and it is transparent to the UE.” is mostly OK, but instead of “forwarded” it would be better to say “exchanged” (as already stated, the concept of data forwarding is not applicable here so it’s better to avoid confusion).

35 – Sony Group Corporation

We are generally fine with the moderator’s proposal. Regarding the third bullet, we prefer Fujitsu’s modification.

36 – BT plc

We agree with the 4 bullets, and we prefer Qualcomm modification for the 3rd Bullet.

37 – China Mobile Com. Corporation

We support the 4 bullets. For the wording of 3rd bullet, we share the similar idea that the forwarded UE dedicated data should not be decoded by NCR. But the NCR should have the capability to decode the common control information to facilitate the operation of NCR.

3.2 Scope on side control information design and signalling

Please provide your views on the updated proposal based on initial round discussion.

Specify the signalling ~~for indication~~ and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF information for efficient interference management and improved energy efficiency*
- *Semi-static power control for the backhaul link (as the 2nd priority)*

Specify control plane signalling and procedures [RAN2, RAN1]

- *The configuration of signalling for side control information indication*
NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed

Feedback Form 8: Q3-2: Any views on the above updated objective on side control information?

1 – Qualcomm Incorporated

We support the addition of power control as the second priority. However, it should not refer to “*semi-static*”. The RAN1 agreement does not refer to *semi-static* power control, and RAN should not decide on this matter. We propose rewording:

- ~~*Semi-static*~~ **Power control for the backhaul link (as the 2nd priority)**

2 – Apple France

If we are going to include power control as side information, then whether semi-static or dynamic power control is considered can be discussed in WG, similar to other side control information

3 – Nokia Italy

In our view, the current wording gives the impression that there is a commitment to specify signaling for semi-static power control which was not recommended by TR from the study item phase. We propose the following modification:

Consider semi-static power control for the backhaul link (as the 2nd priority)

Additionally, we do not support including dynamic power control as this was not a recommended objective during the SI phase.

4 – InterDigital

Ok to consider semi-static power control as 2nd priority for progress. We also don't support dynamic power control.

5 – AT&T GNS Belgium SPRL

Just to reiterate the comments from the initial round, there was **no** consensus in the RAN1 SI phase and conclusions of the TR to include PC as part of the normative phase. Therefore, we propose the following text below. We could also have a RAN checkpoint specific to Power Control.

Further study semi-static power control for the backhaul link (as a 2nd priority)

6 – Pivotal Commware

We agree with ATT's wording on power control.

7 – Philips International B.V.

We agree with Nokia about the current wording on power control and support AT&T's proposed rewording.

8 – Samsung Electronics Co.

In addition to AT&T suggestion, we propose to move the highest bullet level for PC since we do not have conclusion whether to include side control information and how to design the signaling.

Specify the signalling ~~for indication~~ and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF information for ~~efficient interference management and improved energy efficiency~~*

Specify control plane signalling and procedures [RAN2, RAN1]

- *The configuration of signalling for side control information indication*

NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed

Further study semi-static power control for the backhaul link (as a 2nd priority)

9 – CATT

We are fine with the following wording change 'Further study semi-static power control for the backhaul link (as a 2nd priority)'

We don't agree to include dynamic power control as it is already extensively discussed in WG meeting and the majority companies did not prefer to specify this.

10 – Panasonic Corporation

We thought the comment is not limited to the backhaul link as the access link also has the impact to the overall system operation. As it could be just to set the maximum power setting, we don't deny the possibility to set them via the use of OAM. On the other hand, we think to use side control information allow more inter-vendor interoperability. Therefore, our proposal is 'Further study semi-static power control for the backhaul link (as a 2nd priority)'

On the other hand, I have general question. All possible parameters not listed as side control information now means all the remaining parameters shall be OAM (or hard coded) is the implication?

11 – Futurewei Technologies

We support working on power control in the WI and prefer to not narrow down to semi-static at this point. And agree with Panasonic it is not only for backhaul link. In addition, listing objective as 2nd priority often causes issues in WG and ends up back in plenary discussion later. Considering the interests from some operators and vendors while others' hesitation, it is better to list it as study and specify without as a 2nd priority: "Study and specify power control"

12 – CableLabs

We support the extended power control scope. Also as indicated by Panasonic, this should not be limited to backhaul only.

13 – ITRI

We support AT&T's proposal.

14 – Intel China Ltd.

If we want to look at power control, the scope should be minimized. One way could be to focus on semi-static PC and to start after RAN 98e. We will have 1 TU in Q1/2023 but we think it is sufficient due to limited scope. Another option might be to revisit in RAN 98e whether or not to include semi-static PC in the scope after checking the progress in Q4/2022.

15 – MediaTek Inc.

We are fine with the following wording change 'Further study semi-static power control for the backhaul link (as a 2nd priority)'

16 – NTT DOCOMO INC.

We are fine with AT&T's proposal as a middle ground, although we still concern the limited TU for the normative phase.

17 – NEC Corporation

We agree to add power control as one kind of side control information. However, power control shouldn't be associated with link type, and power control on NCR includes gain or transmit power is more reasonable.

18 – OPPO

We do not prefer to include anything that is already studied in RAN1 but not recommended by the TR. As a compromise, we can be fine with Samsung's modification. For other options, it may look contradicting to list a sub-bullet of "further study" under a main-bullet of "Specify".

19 – CEWiT

We are fine to add power control as one kind of side control information. However, power control shouldn't be limited to backhaul link. Support Panasonic's modification

20 – LG Electronics Inc.

We are still negative on power control, but ok to consider if majority wants.
However, even in this case, we want to limit the scope to fit into the allocated TU.
In this sense, we think AT&T's suggestion is the best way to go.
Further study semi-static power control for the backhaul link (as a 2nd priority)

21 – vivo Mobile Communication Co.

For the power control, we support the bullet as it is, We think further study is not necessary, in RAN1 SI phase, the technical aspects have been discussed and the observations have been captured in the TR.

22 – ZTE Corporation

We are supportive of the current wording since the study of PC has already been done in the SI phase and the only pending point is whether to enable it in this R18 or not. So, the proposed version can be a good compromise. Dynamic power control is strongly objected to in the SI phase and no need to re-open it again.

23 – NICT

We support the addition of power control as the second priority.

24 – HuaWei Technologies Co.

We agree with Samsung on updating the objectives.
For power control, we are fine to have it as 2nd priority or to have a more consolidated study in general.

25 – KDDI Corporation

We support Samsung's proposal.

26 – Lenovo (Beijing) Ltd

We share similar view with QC and Apple that details on semi-static and dynamic power control should be discussed in WG level. We also agree with Panasonic that it shouldn't limited to backhaul link only, access link should also be considered.

27 – CITC

China Unicom:

In general we support the moderator's proposal and we also think that it should not be limited to backhaul only.

28 – Sony Group Corporation

We are still reluctant to include PC in R18, due to the limited number of allocated TUs. As a compromise, however, the wordings by ATT or Samsung are agreeable.

29 – Sony Group Corporation

We are still reluctant to include PC in R18, due to the limited number of allocated TUs. As a compromise, however, the wordings by ATT or Samsung are agreeable.

30 – Ericsson LM

We think the topic of power control is still controversial and does not reflect the number companies that indicated not to support power control in the initial round.

The role of the repeater is essentially to make it appear from the UE's perspective that the gNB is located where the repeater is. That is, to negate the pathloss of the backhaul link. Considering the static nature of the backhaul link, there is no need for additional power control to multiplex "direct UEs" with "relayed UEs" since, with the above assumptions, UE power control already exists for this purpose. Additional power control would imply that a high-quality channel is deliberately attenuated in order to adapt to a higher pathloss in a low-quality channel. That is clearly undesirable. We acknowledge that power control based on network planning could be beneficial, but that can be managed by OAM and should be excluded from the RAN1 objectives.

Equally important as adding the repeater functionality in the specification work is to ascertain that no existing functionality is broken. By giving leeway to the NCR to perform PC, in parallel to gNB-UE PC loops, we increase that risk significantly. There is already little time for NCR, we should focus on necessities.

31 – Fujitsu Limited

As for power control, firstly, semi-static power control only would be a good compromise, and we support it. Then, we think it is not good idea to use “2nd priority” in general because “2nd priority” in the WID causes the controversy in WGs while the issue is anyway discussed in the end. If we really want to save the TU for this item, use of 2nd priority would not help. Also, we think study phase is not necessary for semi-static power control because the potential spec impact of semi-static power control is small and the study phase might be just an overhead, Finally, we support Panasonic to remove “for backhaul link”.

32 – NEC Corporation

A clarification on the previous comments.

we think change ”backhaul link” to ”NCR-Fwd” is clearer, which includes access link too.

“Semi-static power control for the ~~backhaul link~~ NCR-Fwd (as the 2nd priority)”

33 – BT plc

We agree with AT&T wording on power control.

34 – China Mobile Com. Corporation

We are fine to include the power control in the normative phase. But considering the limited TU and we have already done a study during the SI phase, we do not support to continue the study of power control. The semi-static PC is a compromise between no specification of PC and dynamic power control. And an open loop power control could also improve the multiple vendors inter-operation at least for the uplink. A simplified normative work for semi-static power control could solve the concern of TU.

3.3 Scope on repeater management

Please provide your views on the updated proposal based on initial round discussion.

– Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]

- NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed ~~based on~~ taking into the account the feedback of other working groups (e.g., SA3 and SA5). From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3.

•

Feedback Form 9: Q3-3: Any views on the above updated objective on repeater management?

1 – Qualcomm Incorporated

Since the TR **explicitly** states that **solution 2 does not provide inter-vendor interoperability**, the WID should emphasize that the normative phase only considers inter-vendor interoperable solutions.

Further, SA3 will not decide on the principal feasibility of solution 2. They can only decide on the feasibility of security-related aspects of solution 2.

To make progress, we propose the following rewording:

*“NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed taking into the account the feedback of other working groups (e.g., SA3 and SA5). **The selected solution shall provide inter-vendor interoperability.** From security point of view, the feasibility of NCR validation procedure in solution 1 and ~~the feasibility of~~ solution 2 will be decided by SA3.”*

2 – Apple France

We support the updated proposal.

3 – Nokia Italy

Support Qualcomm’s proposed modification.

4 – AT&T GNS Belgium SPRL

We support the proposal with the QCOM modifications.

5 – Philips International B.V.

We agree with Qualcomm’s proposal.

6 – Samsung Electronics Co.

We are ok with Q’s version.

7 – Futurewei Technologies

We are also ok with Qualcomm’s version.

8 – III

We agree with Qualcomm’s view.

9 – CableLabs

Agree with QCM’s view.

10 – ITRI

We support Qualcomm’s modification.

11 – Intel China Ltd.

We are fine with QC’s version.

12 – NEC Corporation

We are fine with QC's proposal.

13 – LG Electronics Inc.

We still prefer to do down-selection in RAN plenary. There is not enough TU in RAN2 (note that 0.5 TU is allocated, and we do not want to increase the TU).

14 – OPPO

It is not clear to us what the consequence is for *"the feasibility of ... will be decided by SA3."* Does it mean this RAN WID assigns tasks to SA3? or does it only intend to say something would not be done in RAN? If it is the later case, the WID can make it clear by saying *"the feasibility of ... will not be decided in RAN, but possibly by SA3"*.

15 – ZTE Corporation

We are supportive of the current note since it's aligned with the recommendation in TR. Regarding the updates to add "shall provide xx", it just tries to define the criteria for potential down-selection and we can further discuss it in the WG meeting.

16 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

17 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

18 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

19 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

20 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

21 – China Telecommunication Corp.

We share the similar view with ZTE. We also prefer the current version of note, we think how/which to down-select should be done in WG meeting. Moreover, we think operator can develop corresponding strategies to deal with the issue of inter-vendor interoperability.

22 – China Telecommunication Corp.

Sorry for multiple replies due to the network delay.... Very sorry

23 – HuaWei Technologies Co.

We have similiar view as LGE of prefrence to have down selection in RAN plenary. We are still concerned on how to proceed the work in RAN2 and RAN3 in Q4 without getting clear feedback from SA3 and SA5. If companies really want to have down selection in WGs for all the 4 solutions, we believe this shall start only after both SA3 and SA5 provides feedback, i.e. at least after Q4, otherwise it is just wasting time in RAN2 and RAN3 repeating the discussion.

We agree that inter-vendor operability shall be considered.

We also think validation shall be removed from the objective, this is just one term used in solution 1, the objective shall be kept in a generic way that the target is to have identification and authorization as below.

Specify the solution of network-controlled repeater management (i.e., the identification and authorization/~~validation~~ of NCR) [RAN3, RAN2]

24 – CATT

We share the similar view with ZTE and others that the current note is preferred. Down-selection criteria can be discussed in WG level.

25 – KDDI Corporation

We support the updated proposal.

26 – Lenovo (Beijing) Ltd

Fine with QC's updates.

27 – CITC

China Unicom:

We agree with ZTE that the current note looks good to us. Down-selection can be discussed in WGs.

28 – China Mobile Com. Corporation

CMCC share same view with ZTE, we support the current wording.

29 – Ericsson LM

We support QC’s proposed modification, with a couple of further corrections. “Based on the feedback of other working groups”, as it was originally, is better than “taking into the account”, which tends to “water down” the concept significantly, so we prefer to keep it the way it was. Also, the “e.g.” in parenthesis should become an “i.e.”: no other impacted WGs other than SA3 and SA5 could be identified during the study, and LSs are pending.

30 – Sony Group Corporation

We agree with the additions from Qualcomm.

31 – Fujitsu Limited

Regarding the note, we support the comment by ZTE. The moderator’s proposal is aligned with the TR recommendation, and it would be a good middle-ground at this moment. The down-selection should be done in the WGs.

32 – BT plc

We prefer the moderator’s original proposal, down-selection & criteria can be discussed in the WG once the feedback is received from SA5/SA3.

3.4 Scope on the RAN4 part of NCR

Please provide your views on the updated proposal based on initial round discussion.

Core part:

Study and specify the RF and EMC requirements of NCR [RAN4]

Study and specify the RRM requirements of NCR [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR [RAN4]

Study and define the RRM performance requirements of NCR [RAN4]

Study and define the demodulation performance requirements for C-link of NCR, if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Feedback Form 10: Q3-4: Any views on the above updated objectives on NCR from RAN4 perspective?

<p>1 – Qualcomm Incorporated</p> <p>For the core part, it is up to RAN4 to decide to what extend specification is necessary. Therefore, for both Core Part bullets, the objectives should include “..., <i>as necessary</i>” at the end.</p>
<p>2 – Nokia Italy</p> <p>Support Qualcomm’s proposed modification.</p>
<p>3 – Pivotal Commware</p> <p>We support the QC’s modification also.</p>
<p>4 – AT&T GNS Belgium SPRL</p> <p>We support the updated proposal from the moderator with the proposed modification from Qualcomm.</p>
<p>5 – CableLabs</p> <p>OK with QCM’s modification</p>
<p>6 – Intel China Ltd.</p> <p>We share same view with QC that ‘as necessary’ should be added.</p>
<p>7 – Samsung Electronics Co.</p> <p>We also ok with Q’s version</p>
<p>8 – OPPO</p> <p>We think the ”study and specify” already means there is a study step to filter away what is unnecessary. But to make the scope clearer, we are fine with Qualcomm’s suggestion, while just preferring ”if necessary” instead of ”as necessary”.</p>
<p>9 – China Telecommunications</p> <p>We agree with OPPO comment above.</p>
<p>10 – ZTE Corporation</p> <p>The current wording is already to highlight the needs of the study, which may lead to the case that no enhancements are needed. There is no difference compared to QC’s version. If companies insist, updates are also acceptable.</p>
<p>11 – CATT</p> <p>we are ok with either ‘if necessary’ or ‘as necessary’. In fact we don’t see much difference between these two .</p>

12 – HuaWei Technologies Co.

We agree that "... as necessary" is needed, as we commented in the initial round.

Regarding RF core requirement, we still wonder what exact additional requirements compared to Rel-17 repeater are needed for NCR. In Rel-17 TS 38.106 the operating bands, channel arrangements, output power, frequency stability, out of band gain, unwanted emissions, EVM, input intermodulation, output intermodulation, ACRR, transmit ON/OFF power are all specified. Could proponent elaborate more on what exactly requirements are needed and why they are needed on top of TS 38.106? The current objectives will lead to the open-ended discussion. And any rush to have new requirements/conformance testing and new specifications will cause the big and unnecessary burden for maintenance in the future.

Regarding RRM part, this is not only relevant on whether to reuse existing RRM requirements. Some fundamental questions are not clear as RAN1 and RAN2 have not yet discussed what kind of RRM functions (which have defined many in spec) should be supported by NCR, and therefore it is difficult for RAN4 to identify which kind of RRM requirements need to be defined or reused.

Although the objective is unclear, we understand the proposed RRM requirements apply to NCR-MT. its control link and the reliability can be easily guaranteed by using lower MCS, transmission scheme and beams or even some power boosting at gNB. And considering NCR is stationary, NCR-MT can be implemented in a relative simply way, which would be helpful lowering cost of NCR. So more cost-efficient way is to leave it to implementation. We see no much need to have RRM requirements. If companies want, it should be first studied what kind of RRM functions need to be supported.

Regarding demodulation, there are some fundamental issues which are not studied before, including whether NCR MT support HARQ entity, what channel bandwidth and MCS are expected, where the channel raster should be, what the timing between PDCCH and PDSCH, PDSCH and PUCCH ACK/NACK, etc. These aspects are far beyond RAN4's responsibility and therefore it is premature to say RAN4 work can already be started.

Therefore we suggest the below:

core part:

Study and specify the RF and EMC requirements of NCR if needed [RAN4]

Study the RRM functions to be supported and whether RRM requirements need be specified, and if needed specify the RRM requirements of NCR [RAN2, RAN4]

Note: The existing requirements defined for Rel-17 repeater in RAN4 shall be reused as baseline and further investigate and specify the additional requirements if needed.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR if needed [RAN4]

Study and define the RRM performance requirements of NCR if the necessary RRM functions and core requirements are needed [RAN2, RAN4]

Regarding the domulation part, as explained above, we think either we remove this objective as various aspects were not investigated to confirm the feasibility, or we should start a general study across RAN WGs.

Study the feasibility and need to define the demodulation performance requirements, and if necessary, define the demodulation performance requirements for C-link of NCR [RAN1, RAN4]

Note: The existing requirements defined in RAN4 can be used as baseline if applicable.

13 – HuaWei Technologies Co.

We agree that "... as necessary" is needed, as we commented in the initial round.

Regarding RF core requirement, we still wonder what exact additional requirements compared to Rel-17 repeater are needed for NCR. In Rel-17 TS 38.106 the operating bands, channel arrangements, output power, frequency stability, out of band gain, unwanted emissions, EVM, input intermodulation, output intermodulation, ACRR, transmit ON/OFF power are all specified. Could proponent elaborate more on what exactly requirements are needed and why they are needed on top of TS 38.106? The current objectives will lead to the open-ended discussion. And any rush to have new requirements/conformance testing and new specifications will cause the big and unnecessary burden for maintenance in the future.

Regarding RRM part, this is not only relevant on whether to reuse existing RRM requirements. Some fundamental questions are not clear as RAN1 and RAN2 have not yet discussed what kind of RRM functions (which have defined many in spec) should be supported by NCR, and therefore it is difficult for RAN4 to identify which kind of RRM requirements need to be defined or reused.

Although the objective is unclear, we understand the proposed RRM requirements apply to NCR-MT. its control link and the reliability can be easily guaranteed by using lower MCS, transmission scheme and beams or even some power boosting at gNB. And considering NCR is stationary, NCR-MT can be implemented in a relative simple way, which would be helpful lowering cost of NCR. So more cost-efficient way is to leave it to implementation. We see no much need to have RRM requirements. If companies want, it should be first studied what kind of RRM functions need to be supported.

Regarding demodulation, there are some fundamental issues which are not studied before, including whether NCR MT support HARQ entity, what channel bandwidth and MCS are expected, where the channel raster should be, what the timing between PDCCH and PDSCH, PDSCH and PUCCH ACK/NACK, etc. These aspects are far beyond RAN4's responsibility and therefore it is premature to say RAN4 work can already be started.

Therefore we suggest the below:

core part:

Study and specify the RF and EMC requirements of NCR if needed [RAN4]

Study the RRM functions to be supported and whether RRM requirements need be specified, and if needed specify the RRM requirements of NCR [RAN2, RAN4]

Note: The existing requirements defined for Rel-17 repeater in RAN4 shall be reused as baseline and further investigate and specify the additional requirements if needed.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR if needed [RAN4]

Study and define the RRM performance requirements of NCR if the necessary RRM functions and core requirements are needed [RAN2, RAN4]

Regarding the demodulation part, as explained above, we think either we remove this objective as various aspects were not investigated to confirm the feasibility, or we should start a general study across RAN WGs.

Study the feasibility and need to define the demodulation performance requirements, and if necessary, define the demodulation performance requirements for C-link of NCR [RAN1, RAN4]

Note: The existing requirements defined in RAN4 can be used as baseline if applicable.

14 – Ericsson LM

We raised our concern on RAN4 related objectives in the initial round. But our comments are completely ignored. Proponents of RRM and demod requirements for NCR have not replied to our basic questions:

- Which RRM requirements are needed for NCR? What are the NCR functionalities which need RRM requirements?
- Why demodulation requirements are needed.

As compromise we are fine with the modified core and performance objectives suggested by Huawei.

We also agree with Huawei that there should be NO objective related to demodulation requirements. Anyway demodulation is performance related so there is no urgency to include it at this stage given that the need is highly uncertain.

15 – ZTE Corporation

@Ericsson: Regarding the question on RRM and demo part, in the 1st round discussion, the following content is provided to justify the views:

Regarding the RAN4 part, as we highlighted in the motivation paper, we still need to define some RRM requirements for NCR-MT to ensure the performance of the control link between NCR-MT and parent gNB. We can start with the following cases to define the RRM requirement including 1) RRC Connection Mobility Control (RRC re-establishment, Random access, RRC release with redirection); 2) RLM; 3) Link recovery procedure; 4) NCR-MT timing requirements.

In general, the detailed RRM requirement could be discussed further at the WG level.

For the modulation part, in SI, we already agreed that some indication will be done by both semi-static and dynamic signaling, which means that support of PDSCH/PDCCH is expected.

3.5 Required TUs for Rel-18 NR NCR WI

Companies are still encouraged to share your further views considering the summary from moderator for the first round discussion.

**Feedback Form 11: Q3-5: Any further views on the proposed
TU sheet in RP-222437?**

1 – Qualcomm Incorporated

RAN2/3 work will highly depend on 1) the outcome of RAN1 work, and 2) the down selection among the solutions for NCR authorization. It is not certain that SA3/5 will be able to provide feedback in time for the RAN2/3 October meeting. In the absence of SA3/5 evaluation, RAN2/3 will have no other option as to select one of solutions 3 or 4 since these two solutions do not have any security and OAM concerns. Also, RAN2/3 will certainly not start any work on these solution before down-selection. We are wondering why TU allocation for RAN2/3 cannot start in November.

2 – ZTE Corporation

For RAN2's work, at least the detailed configuration of the signaling can be triggered in parallel with RAN1's discussion (e.g., configured via OAM/RRC/jointly and other control plane procedures). For RAN3's part, as commented by companies in 1st round, discussion on the four solutions in the detail are also possible including a down-selection based on SA3's response. Postponing the start of RAN2/3 in November will further delay the progress of this topic and also have an impact on the completion of RAN1.

3 – HuaWei Technologies Co.

We agree with Qualcomm that the outcome from RAN1 and SA3/SA5 are the major inputs to start work in RAN2 and RAN3. As solution 2 is anyway waiting for SA5's feedback, if companies want to have all solutions on the table before collecting enough information, we should start down selection at next plenary or after November meetings in WGs. If companies now think that with only partial feedback, e.g. SA3 only without waiting for SA5, we then believe our previous proposal makes sense, that in Q4 we shall only start solution 3 and 4 as the previous counter-argument that we should wait for feedback from other WGs before down selection is not valid anymore.

In general we have strong concerns that we waste time in Q4 in RAN2 and RAN3 discussing things with uncertainty. We believe in Q4, the work in RAN2 and RAN3 shall not be started.

4 – Ericsson LM

We stand by our previous assessment that three meetings may prove optimistic considering the multiple inter-WG liaisons that have been identified. However, if we are the only one with this opinion, we can agree to the proposed time plan. Furthermore, we strongly object to RAN1 discussing signaling options (RRC/OAM/both): RRC issues shall be discussed by RAN2, and OAM configuration shall be discussed by RAN3 according to the ToR.

5 – Sony Group Corporation

We think that RAN2/3 should focus on the work triggered from RAN1 and not work on details of any solution.

6 – China Mobile Com. Corporation

We do not support to postpone the RAN2/3 work. There are still details and the RAN1 triggered issues that need more discussions.

3.6 Moderator's observations and proposals

3.6.1 Scenarios and assumptions for NR NCR

As observed from the feedback received, the majority is fine with the proposal but still with received comments on following aspects:

1. NCR's behavior over the data forwarded from/to UE: According to the different updated versions proposed by companies, it seems that more detailed description is needed to clarify that all channels, including the case that RS/data which are dedicated to UE should be transparently forwarded by NCR without any additional processing at NCR side. While some other companies suggested to drop the description on this, the majority seems to be fine with Qualcomm's proposal.
2. Applicable frequency range: As commented by companies, for mechanism to enable NCR, both FR1 and FR2 should be covered in the normative work to support coverage extension. Only one company [Huawei] further commented on the applicability of NCR in FR1 especially in the perspective of beam correspondence. Regarding whether beam is supported or not in FR1, it purely depends on the NCR feature design with potential impacts on the RAN4 part. It is the majority's view that FR1 should not be precluded. To find the middle ground, we can try to reuse the wording from SID that saying FR2 deployments may be prioritized.
3. Operation over different sub-band issue: We already agree that the NCR will be in-band repeater and if operation over multiple-sub-band is expected for NCR-Fwd, it can be done by implementation.

The normative work of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:

- *Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867, while FR2 deployments may be prioritized for both outdoor and O2I scenarios.*
- *For only single hop stationary network-controlled repeaters*
- *The NCR is not expected to decode dedicated information forwarded between UE and network and it is transparent to the UE.*
- *Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

3.6.2 Observation and proposal for the scope on the side control information design and signalling

As observed from the feedback received, the proposed scope seems stable except for the bullet point related to PC. Considering the repeated comments from different camps (i.e., With/without PC, limited scope with

restriction), it seems that the original proposal in the intermediate round is still a good compromise to address this issue since the majority is fine to support this only if this is semi-static.

Meanwhile, some of the companies proposed to study this only. It should be noticed that the study on power control has already been done in RAN1 with the following progress:

'The controlling of the amplifying gain of NCR-Fwd is considered to enable the power control of NCR-Fwd if PC is recommended as side control information for NCR in Rel-18.'

So, as many companies pointed out, it is meaningless to trigger the study again especially with limited TUs. It is more desirable to focus on whether this feature is supported or not.

Therefore, the moderator suggests to update the proposal as follows:

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming*
- UL-DL TDD operation*
- ON-OFF information*
- Semi-static power control for the backhaul link (as the 2nd priority)*

Specify control plane signalling and procedures [RAN2, RAN1]

- The configuration of signalling for side control information indication*
 - NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed*

3.6.3 Observation and proposal for the scope on repeater management

As observed from the feedback received, the majority is fine with doing down-selection in WI phase as recommended in the TR and WGs. One comment is received to refine the main bullet point and other comments are for the note:

1. For the comment to remove 'validation' on the main bullet point, it's actually equivalent to preclude the solution-1, which is not acceptable by many companies. As a part of solution-1, it has been already captured in TR, we need to keep it for discussion in normative phase.
2. For the comments to add the 'The selected solution shall provide inter-vendor interoperability.', it also implies to preclude the solution-2. We understand different preferences from companies, and let's decide the criteria for down-selection as a part of technical discussion in WGs.
3. For the comments to refine the description, the current wording (i.e. *From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3*) has been captured in TR, it should be fine since this wording is based on the consensus reached in WG. Please note that the feasibility here only refers to the feasibility from security point of view. If we make the change - "feasibility of solution 2", it will change the meaning of the whole sentence.

Therefore, the moderator suggests to update the proposal as follows:

Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]

NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed based on ~~taking into the account~~ the feedback of other working groups (e.g., i.e., SA3 and SA5). From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3.

3.6.4 Observation and proposal for the scope on RAN4 part of NCR

As observed from the feedback received, the pending point is whether to include the potential discussion on RRM and demod requirements. As clarified by proponent companies, some potential aspects, e.g., define the RRM requirement including 1) RRC Connection Mobility Control (RRC re-establishment, Random access, RRC release with redirection); 2) RLM; 3) Link recovery procedure; 4) NCR-MT timing requirements. And for the demodulation part, in SI, we have already agreed that some indication will be done by both semi-static and dynamic signaling, which means that support of PDSCH/PDCCH is expected.

While the scope of RAN4 has been already included "study" part in the previous version, we can further check the necessity in WG group discussion. So, for the comments to refine the wording, it's fine to incorporate it.

Therefore, the moderator suggests to update the proposal as follows:

Core part:

Study and specify the RF and EMC requirements of NCR if necessary [RAN4]

Study and specify the RRM requirements of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR if necessary [RAN4]

Study and define the demodulation performance requirements for C-link of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

3.6.5 Observation and proposal on the required TUs

Based on the feedback, there is no clear majority on changing the originally-planned TU allocation in RAN1/2/3. Given that any change on TUs may need to have further plan on overall TUs of each WG, it seems that sticking to the original plan for RAN1/2/3 is a better way forward at this point. Regarding the detailed scope for each WG, especially in RAN2 and RAN3, we believe how to ensure proper handling on the topics can be up to WG chairs.

For the RAN4 TU, with the updated proposal on the RAN4 objectives (which are stable), it seems that the proposed TUs are reasonable, especially considering the additional study phase.

Therefore, the moderator suggests to keep the original plan.

4 Final round discussion on the scope of R18 NCR WI

4.1 Scenarios and assumptions for NR NCR

Please provide any further views on the updated proposal based on intermediate round discussion. If no consensus on the detailed wording in the final round, it is suggested, from the moderator's perspective, to fall back to the exact wordings of the original scenarios/assumptions from the SID.

Proposal 4.1:

The normative work of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:

- Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867, while FR2 deployments may be prioritized for both outdoor and O2I scenarios for the normative work.*
- For only single hop stationary network-controlled repeaters*
- The NCR is not expected to decode dedicated information forwarded between UE and network and it is transparent to the UE.*
- Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

Feedback Form 12: Q4-1: Any further concerns on the updated proposal for scenarios/assumptions?

1 – AT&T GNS Belgium SPRL

We strongly disagree with the new change proposed in the first bullet. All but one or two companies were supportive of the bullets in the Intermediate round. Not to mention, "may be prioritized" is quite ambiguous if it were to be included.

We are fine with the change proposed in the 3rd bullet, which is consistent with the QCOM proposal in the last round. Thanks

2 – FirstNet

We strongly disagree with the new proposed change in the first bullet. Please revert back to Intermediate Round version.

3 – OPPO

We found the 3rd bullet still likely causing misunderstanding, to be more specific:

1). The wording "dedicated information" causes to allow a case that actually should not be expected: the NCR may decode a group-common information (which is not dedicated information) where the group does not include the NCR-MT.

2). As pointed by OPPO and Fujitsu in the intermediate round, NCR does not have the capability to identify UE from specification perspective. An NCR may not even know whether the forwarded signal indeed contains a NR-format signal component for an UE that is served by itself but not directly by gNB. Therefore it can be a bit misleading to use the wording like "between the UE and network" and "to/from UE" in the description of NCR forwarding behavior/functionality.

Given this is the last round, maybe it is more promising to progress by only keeping the UE transparency part.

4 – Qualcomm Incorporated

We agree with AT&T and FirstNet on the addition to the first bullet. We do not support this addition.

On the third bullet: Based on feedback by OPPO, we could reword the 3rd bullet to:

The NCR is not expected to decode dedicated information forwarded between UE and network access and backhaul, and it is transparent to the UE.

5 – Samsung Electronics Co.

We support Q's revision for 3rd bullet. "dedicated" is not clear.

6 – OPPO

Appreciate the quick update from Qualcomm. However, for an in-band NCR, the NCR cannot remove the signal needed by NCR-MT operation from the whole signal forwarded from backhaul to access. Such signal can be either common signal or dedicated signal from NCR-MT perspective, and is contained in the forwarded signal/information. Therefore the updated 3rd bullet from Qualcomm can be misinterpreted as the NCR cannot decode anything when working in-band. In short, the 3rd bullet seems still not safe and sound.

7 – Rakuten Mobile

We support Qualcomm's modification.

8 – Panasonic Corporation

We agree OPPO's understanding that Qualcomm update exclude common signal to be used for NCR. We are ok with *The NCR is not expected to decode dedicated information forwarded between UE* . If either of the modification attempt does not work well, to keep the original wording can be one way.

9 – Fujitsu Limited

Regarding the 3rd bullet, we do not support QC's version. We are not sure whether 'The NCR is not expected to decode information forwarded...' implies that 'The NCR processes SRS from UEs' is supported. As we commented in previous round, 'decode' is unclear and may cause some other confusions.

If no consensus can be achieved, we prefer the original version in SI, ”**Network-controlled repeaters are transparent to UEs.**”

Besides, we are wondering whether the following behavior of NCR is common sense among companies:

- The NCR cannot decode any UE-specific information and cannot process/identify any RS dedicatedly sent to/from UEs.
- The NCR can decode/process some common information/signal in the forwarded signal from the gNB when those information/signal are needed by NCR-MT.

10 – Panasonic Corporation

I share Fujitsu’s understanding on NCR behaviour.

11 – Telstra Corporation Limited

We agree with AT&T and FirstNet comment on the first bullet and would like to revert to the version in the intermediate round.

12 – Intel China Ltd.

For 1st bullet, we side with AT&T, FirstNet, Qualcomm and Telstra.

For 3rd bullet, we think the wording provided by moderator is better than QC’s, because QC’s version implies NCR can’t process any common signal which is also useful for NCR. Regarding OPPO’s question, in our understanding, ‘dedicated’ includes UE-group specific signaling (but the group does not include NCR-MT). Regarding Fujitsu’s question, if ‘decode’ would give wrong impression that it does not include reference signaling detection, we can consider ‘process’ instead of ‘decode’. Therefore, we suggest to update the wording ‘*The NCR-MT is not expected to process dedicated information forwarded between UE and network and it is transparent to UE.*’

Regarding Fujitsu’s last question for NCR behavior, we share same understanding with Fujitsu. 3rd bullet is intended to capture this in WID to avoid further debate in WI phase (which happened in SI phase).

13 – vivo Mobile Communication Co.

For the 3rd bullet, we prefer to keep the “dedicated information”, it is clear that NCR can still decode group common signaling.

14 – CEWiT

For the third bullet prefer

- The NCR is not expected to decode any UE-specific information forwarded between UE and the network and it is transparent to UE

15 – Spreadtrum Communications

Support these 4 bullet. For the 3rd bullet, we think the current wording is sufficient.

16 – China Telecommunication Corp.

We also disagree the change in the first bullet, we prefer the original one in the Intermediate round.

17 – IIT Kanpur

For the third bullet, the current wording by moderator seems fine. If no consensus is reached, we think it is better to fall back to the original wording of SID.

18 – IIT Kanpur

For the third bullet, the current wording by moderator seems fine. If no consensus is reached, we think it is better to fall back to the original wording of SID.

19 – KT Corp.

For the first bullet, KT prefers the original one in the intermediate round.

For the third bullet, we support Qualcomm's suggested modifications

20 – Apple France

For the 1st bullet, we also prefer to revert back to the previous version.

For the 3rd bullet, we would be fine with the current version, or the update suggested by Intel. However, if no consensus can be reached on this, then as a compromise, our suggestion would be add "at least" for dedicated information and add a note for common information to be discussed in RAN1.

The NCR is not expected to ~~decode~~ process dedicated information forwarded between UE and network and it is transparent to the UE

Note: Whether NCR can process common information forwarded between UE and network can be further discussed in RAN1

21 – KDDI Corporation

- For first bullet, we also share the view with AT&T and others. We prefer not to have FR2 prioritization wording.
- For 3rd bullet, we are fine with the current wording.

22 – China Mobile Com. Corporation

For the 3rd bullet, our preference is that the NCR should not decode the dedicated information such as control signalling and data for the access UE. But the NCR could decode the common control information and reference signals, which would be useful for NCR-MT to operate. For the group common control signals, our understanding is the original group common signaling are designed for the normal UE not for NCR-MT. The side control signalling for NCR-MT/forwarding should be differentiated from the signalling for the normal UEs.

If no consensus is reached for the 3rd bullet, we are fine to return to the version in SID as below.

- Network-controlled repeaters are transparent to UEs

For the 1st bullet we are fine with current version, although the outdoor and O2I scenarios will not explicitly appear in the normative phase. For the priority of FR1 and FR2, our position is same as we were discussing for the SID. The technologies for the NCR should not differentiated between FR1 and FR2. **But we could focus on FR2 design and the technologies should also be compatible to FR1.** A unified design is feasible for NCR in FR1 and FR2.

23 – China Mobile Com. Corporation

For the 3rd bullet, our preference is that the NCR should not decode the dedicated information such as control signalling and data for the access UE. But the NCR could decode the common control information and reference signals, which would be useful for NCR-MT to operate. For the group common control signals, our understanding is the original group common signaling are designed for the normal UE not for NCR-MT. The side control signalling for NCR-MT/forwarding should be differentiated from the signalling for the normal UEs.

If no consensus is reached for the 3rd bullet, we are fine to return to the version in SID as below.

- Network-controlled repeaters are transparent to UEs

For the 1st bullet we are fine with current version, although the outdoor and O2I scenarios will not explicitly appear in the normative phase. For the priority of FR1 and FR2, our position is same as we were discussing for the SID. The technologies for the NCR should not differentiated between FR1 and FR2. **But we could focus on FR2 design and the technologies should also be compatible to FR1.** A unified design is feasible for NCR in FR1 and FR2.

24 – NICT

For the first bullet, we prefer to revert back to the previous version.

For the third bullet, we are fine with the current wording.

25 – ITRI

For 1st bullet we agree with AT&T and FirstNet. No additional wording required.

For the 3rd bullet we support Qualcomm's wording.

26 – CATT

For the first bullet, we are fine to remove the added change.

For the third bullet, we can change back to 'Network-controlled repeaters are transparent to UEs' if no consensus reached.

27 – Lenovo (Beijing) Ltd

Regarding the 3rd bullet, we share similar view as Intel on the common signaling. We are fine with current wording proposed by moderator.

Regarding the priority between FR1 and FR2, we also prefer the version in the intermediate round.

28 – ZTE Corporation

For the 1st bullet, it's acceptable, but prefer to remove it according to the interests of the operator.

For the 3rd bullet, it's preferred to keep "dedicated" to highlight the intrinsic feature of NCR. Regarding the comment on "whether the UE can be identified by NCR", we can also take the version as "only detect its own information". If still no consensus, we prefer to keep the wording in SI.

29 – NTT DOCOMO INC.

For the first bullet, we also prefer the original text in the intermediate round.

30 – HuaWei Technologies Co.

We still have the questions in mind how to support beam correspondence for FR1. NCR is expected to be low cost, implementing an NCR with beam correspondence in FR1 which is not currently supported is contradicting to this objective. If companies are against the addition of first bullet from the moderator, as the moderator pointed out that the beam correspondence part only impacts RAN4, we think we should make it clear that there is no additional RAN1/RAN2 specification impact to support FR1 and at least RAN4 work should prioritize FR2.

Regarding the third bullet, we agree with CMCC that original wording **Network-controlled repeaters are transparent to UEs** can be sufficient.

31 – Kyocera Corporation

For 1st bullet, we agree with AT&T, FirstNet, Qualcomm, Telstra, Intel and other companies, i.e., the intermediate round version is preferable.

For the 3rd bullet, we're fine with Intel's wording.

32 – LG Electronics France

We also want to revert back the 1st bullet to the intermediate version since we don't need to make difference between FR1 and FR2 at this stage.

33 – LG Electronics France

We also want to revert back the 1st bullet to the intermediate version since we don't need to make difference between FR1 and FR2 at this stage.

34 – Deutsche Telekom AG

For the first bullet, we also prefer the original text in the intermediate round.

We also do not like this addition "*NCR is not expected to decode dedicated information forwarded between UE*" -> we should simply keep "Network-controlled repeaters are transparent to UEs"

35 – BT plc

For the first bullet, we agree with AT&T & others, and prefer the original text in the intermediate round.

36 – Fujitsu Limited

For the first bullet, we prefer the wording in intermedia round.

For the third bullet, we support intel's version. If intel's version cannot be agreed, we prefer the original version in SI.

37 – Ericsson LM

We support QC's further revision of the 3rd bullet, possibly with a tiny change if agreeable: "The NCR is not expected to decode information *exchanged* between access and backhaul, and it is transparent to the UE." "Is not expected to..." in our understanding refers to standardized behavior, i.e., it does not preclude an implementation doing so without standards impact.

We have **strong concerns that the moderator claims** that only one company, Huawei, commented on the unconditional inclusion of FR1. We share Huawei's concerns and clearly pointed that out in our comments in both the first and second rounds. Again, including FR1 functionality, apart from what is also supported by FR2, has not been discussed and will require different solutions in the fundamental aspects of the specification work. We can agree to "*...used for network coverage in FR2 bands and also FR1 bands in as much they rely on specification for FR2 bands.*"

Regarding **support for independent sub-band operation**, this is a feature that we think most operators would support and is **not easily included by implementation**. For this reason, we think that some work in the WGs can be spared if RAN already now can agree to include it. Hence, we propose to add "*The network-controlled repeater may support independent operation in different sub-bands of the supported frequency band.*"

38 – Sony Group Corporation

For the first bullet, we disagree with the newly proposed wording and would like to revert to the wording of the intermediate round version.

For the third bullet, we support QCOM's proposal "*The NCR is not expected to decode ~~dedicated~~ information forwarded between UE and network access and backhaul, and it is transparent to the UE.*" Even better, "*The NCR is unaware of the contents of the ~~dedicated~~ information forwarded between UE and network access and backhaul, and it is transparent to the UE.*" Information required by the NCR-MT, either dedicated for group-common, comes through the control link. Whether some information in the control link is also forwarded between the access and the backhaul is not relevant, since the NCR would be unaware. If agreement cannot be reached, then we also prefer to fall back to the original formulation: "*Network-controlled repeaters are transparent to UEs.*"

39 – Philips International B.V.

For the first bullet, we also prefer the previous version.

For the third bullet, we prefer to state simply, "Network-controlled repeaters are transparent to UEs," since everyone seems to agree with that. We can also support Qualcomm's proposal as reworded by Ericsson.

40 – Philips International B.V.

For the first bullet, we also prefer the previous version.

For the third bullet, we prefer to state simply, "Network-controlled repeaters are transparent to UEs," since everyone seems to agree with that. We can also support Qualcomm's proposal as reworded by Ericsson.

41 – Philips International B.V.

For the first bullet, we also prefer the previous version.

For the third bullet, we prefer to state simply, "Network-controlled repeaters are transparent to UEs," since everyone seems to agree with that. We can also support Qualcomm's proposal as reworded by Ericsson.

42 – Philips International B.V.

For the first bullet, we also prefer the previous version.

For the third bullet, we prefer to state simply, "Network-controlled repeaters are transparent to UEs," since everyone seems to agree with that. We can also support Qualcomm's proposal as reworded by Ericsson.

43 – TELECOM ITALIA S.p.A.

For the first bullet, we agree with AT&T & others, and prefer the original text in the intermediate round.

44 – VODAFONE Group Plc

1st Bullet: We also think (like AT&T and others) the changes are not needed.

3rd Bullet: The change with "not expected to decode" is totally unclear to me. Does it mean, it is allowed and if so, does it mean we like to standardize something for that? I think Deutsche Telekom comment is correct. All what is needed is that NCR is transparent to the UEs

45 – Apple France

Additional comments on 3rd bullet

In our view, just saying that NCR is transparent to the UEs doesn't imply the other way around i.e., NCR is unaware about UE channels/signals. This part is also needed.

So first suggestion is to take "NCR is transparent to the UEs" as a separate bullet and hopefully this is agreeable to all.

Then the second part whether NCR can process/decode UE's signal/channels should be another bullet. For this part, maybe simple text could be "NCR is unaware about the content and type of channels/signals forwarded between network and the UEs"

4.2 Scope on side control information design and signalling

Please refrain from repeating the same comment made from previous rounds. Please further comment whether the proposal is acceptable to you or if you have any new points to make. If no consensus can be reached on power control, the only proposal can be made, from the moderator's perspective, is to fall back to the TR conclusion which is based on RAN1 consensus.

Proposal 4.2:

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming*
- UL-DL TDD operation*
- ON-OFF information*
- Semi-static power control for the backhaul link (as the 2nd priority)*

Specify control plane signalling and procedures [RAN2, RAN1]

- The configuration of signalling for side control information indication*
 - NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed*

Feedback Form 13: Q4-2: Any further views on the updated objective on side control information?

1 – AT&T GNS Belgium SPRL

We are ok with the moderator proposal with the assumption that "as the second priority" there needs to be sufficient justification if we are to include PC as part of the side control information.

2 – Pivotal Commware

We side with what CATT and LG previously said: "we should respect the TR recommendation (Power Control is not recommended)", especially considering limited TU and the lack of *true* consensus on the side control.

But for the sake of progress we could live with a correction by a few companies (ATT, others) in the previous round:

"Further study semi-static power control for the backhaul link (as a 2nd priority)"...

or

"Consider ...".

3 – Qualcomm Incorporated

We are fine with the first three bullets. We can accept the bullet on PC as a reasonable compromise among the various views.

4 – OPPO

We wonder what "as the 2nd priority" means for a WI that lasts only 3 meetings in RAN1. Does it mean RAN1 has to start the "specify" work of PC in November meeting? or it only means "when time allows after RAN1 completes the 1st priority tasks"? Clarification is needed here. But in either case, we fail to see the justification to add this non-TR-recommended work to a short term WI with limited TU.

5 – Samsung Electronics Co.

As we commented previous round, RAN1 have **NO conclusion for PC as side control information and specify**. We strongly suggest to have the following modification.

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF information*

Specify control plane signalling and procedures [RAN2, RAN1]

- *The configuration of signalling for side control information indication*
- *NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed*

Further study Semi-static power control for the backhaul link (as the 2nd priority)

6 – Telstra Corporation Limited

We are also happy with the proposal for bullet four to be added to the scope.

7 – Intel China Ltd.

We can live with power control with limited scope, i.e., semi-static PC, and ‘2nd priority’ is needed to ensure power control does not consume too much time to impact the progress of beamforming/on-off/TDD operation which is more critical for R18 NCR in WI phase. As we suggested in intermediate round, one way is to start the 2nd priority power control after RAN 98e, or revisit in RAN 98e whether or not to include PC in the scope after checking the progress in Q4/2022.

If the power control is to be captured in WID now, we prefer Samsung’s version, i.e., further study for power control is needed and it is more proper to list as a separate bullet rather than as a sub-bullet under ‘specify...’ together with beamforming/on-off/TDD, because we did not have any consensus to support and specify PC as side control information yet.

8 – vivo Mobile Communication Co.

We are fine with the proposal. The scope of PC has been reduced significantly, this should be a good compromise.

9 – CEWiT

We are fine with the proposal in general. For the PC part prefer

- *Semi-static power control for the ~~backhaul link~~ NCR-Fwd (as the 2nd priority)*

10 – KT Corp.

KT is happy with moderator’s proposal

11 – Apple France

We are fine with the moderator’s proposal as a good compromise

12 – Apple France

We are fine with the moderator’s proposal as a good compromise

13 – KDDI Corporation

We agree with Samsung since NO conclusion for PC. So we think the bullet for power control should be independent and separated from the bullet for other side control information.

14 – NEC Corporation

We share the similar view as CEWiT, just as the comment in intermediate round discussion, we prefer to include both backhaul link and access link for power control:

Semi-static power control for the backhaul link NCR-Fwd (as the 2nd priority)

15 – Spreadtrum Communications

We support Samsung's modification.

16 – China Mobile Com. Corporation

We support current version with the 4th bullet of power control. And for the 2nd priority, we are fine with it. But we do not support to set a starting time for this bullet, which is not proper and may induce more discussion during the WI phase if there are some controversial issues. We can believe the WG chair and FLs could handle this 2nd priority issue properly.

As we commented in the last round, it is not proper to do a study in the WI phase and even in such a TU limited situation. From our view, the 2nd priority is enough to illustrate current situation.

17 – Panasonic Corporation

We support the view from CEWiT and NEC to modify to NCR-Fwd.

18 – ITRI

We are ok with the moderator proposal.

19 – CATT

We are fine with the proposal. We are also fine with Samsung's modification. For us, '*as the 2nd priority*' means if no TU left this could be dropped out without discussion.

20 – Lenovo (Beijing) Ltd

We support power control in the scope and we are fine with the proposal as a compromise.

21 – ZTE Corporation

We support the current version on PC. For the proposal to further study, as mentioned in the summary, RAN1 has already discussed the related issue and the only pending point is whether to support this feature.

For the changes to NCR-Fwd, it seems that the scope is extended to cover the access link, which is not preferred by another side, so, we prefer to keep the backhaul link.

22 – HuaWei Technologies Co.

We are OK with the above objectives, with our comment in 4.1 taken into account. Regarding the power control bullet, we also support the change proposed by Panasonic, NEC and CEWiT, which is more accurate.

23 – HuaWei Technologies Co.

We are OK with the above objectives, with our comment in 4.1 taken into account. Regarding the power control bullet, we also support the change proposed by Panasonic, NEC and CEWiT, which is more accurate.

24 – NTT DOCOMO INC.

We support the modification by Samsung. And, with considering the situation, we can live with the moderator proposal.

25 – Kyocera Corporation

We're fine with the moderator's suggestion, except for the first sentence. We think the sub-band operation may be allowed by implementation from RAN1's perspective, but we still think the specification should allow such a beneficial implementation from RAN2's perspective. So, we prefer to add "(s)" for NCR-Fwd, i.e., "*Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd(s) [RAN1, RAN2]*".

26 – Kyocera Corporation

We're fine with the moderator's suggestion, except for the first sentence. We think the sub-band operation may be allowed by implementation from RAN1's perspective, but we still think the specification should allow such a beneficial implementation from RAN2's perspective. So, we prefer to add "(s)" for NCR-Fwd, i.e., "*Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd(s) [RAN1, RAN2]*".

27 – Samsung Electronics Co.

Based on the discussion here, we found different voice for PC, whether to support backhaul or Fwd link, whether to support as side control information or not. This reveals study on PC is not completed. We still suggest to have further study on PC.

28 – Deutsche Telekom AG

It seems that there is no firm understanding and conclusion on the need for (semi-static) PC yet in RAN1. Hence we support continuing the study on these aspects, while we still believe that it is important for NCR to control interference.

29 – BT plc

We are fine with the moderator's proposal.

30 – Ericsson LM

We still **do not agree** to include power control in the WID. As other companies have stated, power control was discussed in the study phase without progress and continued discussions are unlikely to change that and will only waste valuable meeting time. Introducing power control will have consequences for channel reciprocity that is fundamental to channel estimation. That, in turn, may result in the **repeater no longer being transparent to the UE**, something we all agree on should be the case.

31 – Fujitsu Limited

On power control, we still prefer not to use 2nd priority because it always cause the problem in WGs. But we can accept the proposal by moderator. We agree with other companies that “backhaul link” should be modified to “NCR-Fwd”.

32 – Nokia Italy

In our view, agreeing to further study of semi-static power control was a compromise that seemed to have fairly broad support. As noted previously, it has not been recommended to specify new signaling/behavior for power control and the benefit of supporting it is clearly controversial.

We share a similar view with Ericsson, that DL power control should not be expected to provide benefit for a static backhaul link and in UL scenario UE power control should be sufficient.

If we do not agree to further study, then we do not see a clear motivation to include a controversial topic that was not recommended for specification as part of the study, especially given the already short schedule for completing the primary objectives. As a compromise we could accept Samsung’s modified proposal; otherwise, we do not support including power control.

33 – Philips International B.V.

Judging by the discussion over the last few days, there is still much to be studied for power control and we share Ericsson’s and Nokia’s concerns with including it in the WID. If power control is nevertheless to be added, then we support the editorial modification proposed by Samsung in comment #5. We can also agree with others on changing ’backhaul’ to ’NCR-Fwd’.

34 – Philips International B.V.

Judging by the discussion over the last few days, there is still much to be studied for power control and we share Ericsson’s and Nokia’s concerns with including it in the WID. If power control is nevertheless to be added, then we support the editorial modification proposed by Samsung in comment #5. We can also agree with others on changing ’backhaul’ to ’NCR-Fwd’.

35 – Sony Group Corporation

We support Samsung’s modification, i.e., to have PC as a separate note: “*Further study Semi-static power control for the backhaul link (as the 2nd priority).*”

4.3 Scope on repeater management

Please provide any further comments on whether the proposal is acceptable to you or if you have any new points to make. The current description is based on the wording from TR conclusion which is the consensus from WGs. It is recommended to give clear justification on why the current wording is not acceptable to you.

Proposal 4.3:

Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]

- NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed based on ~~taking into the account~~ the feedback of other working groups (e.g., i.e., SA3 and SA5). From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3.

Feedback Form 14: Q4-3: Any further views on the objective of repeater management?

1 – AT&T GNS Belgium SPRL

As the NOTE now reads, we are solely relying on the feedback from SA3 and SA5 to make a decision on down-selection of solutions. This is hopefully not the case as this is a RAN1-led WI. The NOTE read much better in the intermediate round that RAN1 is to take into account the feedback from other WGs for some of the 4 proposed solutions. The "i.e." vs e.g., change is good. We propose to revert the 1st change back to the intermediate round wording with a small edits as "taking into account" is corrected as follows:

NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed based on taking into~~the~~ account the feedback of other working groups (e.g., i.e., SA3 and SA5). From a security point of view, the feasibility of the NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3.

2 – Qualcomm Incorporated

We believe RAN should **only support solutions that provides inter-vendor interoperability**. This should be a TSG RAN decision, not a RAN WG decision, since it is not a technical matter.

Again, we propose adding the note "**The selected solution shall provide inter-vendor interoperability**" to the WID. Again, this note is needed since the TR claims that solution 2 is not inter-vendor inter-operable.

In the intermediate round, there were 16 companies supporting this view. The moderator may have overseen this strong support, and we hope that the moderator will take this strong majority into consideration.

We would like to emphasize that this note represents a **way forward proposal** since it **allows selecting a variant of solution 2 that actually can support inter-vendor interoperability**.

We further want to emphasize that **single-vendor solutions**, i.e., solutions that do not support inter-vendor interoperability, **can be provided via implementation**, i.e., do not require 3GPP effort.

3 – OPPO

We understand the very last sentence comes from TR. But we still have questions as following: whether the feasibility decision by SA3 is considered as part of this RAN WI? If yes and for some reason SA3 does not come up with a decision at the end (which if happens is out of control of RAN), would this RAN WI be considered complete? It maybe safer to say something as below:

*From a security point of view, the feasibility of the NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3, **which is not part of this WI.***

4 – ZTE Corporation

Moderator's reply:

To QC:

As I explained in the moderator's observation, putting your proposed note will essentially preclude solution 2 which is not aligned with TR conclusion on doing the down-selection in WI phase. Some companies including operators raised the concern on it. If we simply do the counting, please note that in the previous rounds of discussion, 21 companies indicated their support (i.e. preference or ok with) on doing down-selection during WI phase. Some companies may be okay either way. Among the 16 companies you mentioned, I think two of them didn't explicitly support your addition so they may prefer down-selection. Therefore, still from the moderator's perspective, aligning with the TR conclusion (i.e. downselection in the WI phase) is still the majority's view in this RAN plenary discussion so far. Having said that, as a moderator, I am open to continue discussing about it in the final round. I am putting the list of supporting companies and ask for further view on adding the note you mentioned. Companies are encouraged to provide further comments on this.

Ok with downselection in WI phase: Apple, CATT, Intel, KT, KDDI, MediaTek, Fujitsu, ZTE, NEC, Verizon, Spreadtrum, ITRI, vivo, China Telecom, Rakuten, III, Kyocera, CITC, BT, Lenovo, China Mobile (21)

Ok with "The selected solution shall provide inter-vendor interoperability" proposed by QC: QC, Nokia, AT&T, Philips, Samsung, Futurewei, III, Cablelabs, ITRI, Intel, NEC, Lenovo, Ericsson, Sony (14)

To all interested companies,

Please add your preference if it is missed on the current list or please correct me if I put your company in the wrong place.

To OPPO:

As mentioned, I just follow the TR conclusion (which is a consensus on the WG) to avoid further debate on the wording. I think you made a reasonable point that we cannot control the work on SA3 from RAN side. This is only our expectation from RAN side. Let me try the following wording:

From a security point of view, the feasibility of the NCR validation procedure in solution 1 and the feasibility of solution 2 are expected to be ~~will be~~ decided by SA3.

Please provide view on whether you have concern on the above wording. Thanks!

5 – ZTE Corporation

Moderator's reply:

To AT&T,

One company suggested using "based on" instead in the previous round. From moderator's perspective, it does not make much difference since we do not say "solely" here. In any case, let's see if others have strong concern on your proposal.

Together with the change based on the suggestion from OPPO, the NOTE is now updated as follows. Interested companies please raise any concerns on this detailed wording.

Updated NOTE:

NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed ~~based on~~ taking into the account the feedback of other working groups (e.g., i.e., SA3 and SA5). From a security point of view, the feasibility of the NCR validation procedure in solution 1 and the feasibility of solution 2 ~~are expected to be~~ will be decided by SA3.

6 – Telstra Corporation Limited

Telstra strongly agrees with QC that "**the selected solution shall provide inter-vendor interoperability**" and that this is a RAN plenary decision to make. That any standards body would consider anything else is, frankly, strange.

7 – AT&T GNS Belgium SPRL

Follow-up reply to Moderator:

Thanks for the suggestions/updates to reach consensus.

In our view, "based on" versus "taking into account" can be taken as two entirely different things. As I understand it, SA3/5 is not selecting/down-selecting from the potential solutions, but RAN2/3 will take their feedback into consideration for down-selection. Prefer to keep the original wording that all but 1 company was fine with in the intermediate round.

Secondly, on the moderator's reply to QC and others on down-selection, the two "camps" are not mutually exclusive:

Ok with down-selection in WI phase

Ok with "The selected solution shall provide inter-vendor interoperability" proposed by QC

From the AT&T perspective, we are ok with both. In our view, inter-vendor interoperability can either be explicitly stated here or it can hopefully be implied as part of the down-selection criteria. Our slight preference, would be to include the statement explicitly per the QC suggestion.

8 – KT Corp.

KT can live with current version. However, we share the same concern with Qualcomm and would prefer to add a note "**The selected solution shall provide inter-vendor interoperability**" just to make sure that this is considered from the baseline.

9 – KT Corp.

KT can live with current version. However, we share the same concern with Qualcomm and would prefer to add a note “**The selected solution shall provide inter-vendor interoperability**” just to make sure that this is considered from the baseline.

10 – Apple France

We are fine with the moderator’s proposal in current version

11 – China Telecommunication Corp.

We are fine with the proposal, as for whether to delete ”taking into account”, we think both are ok.

12 – KDDI Corporation

We also think it’s better to mention interoperability aspects as QC but at the same time we understand the moderator’s concern as well. So, as a compromise how about to add the sentence like “down selection shall be done considering inter-vendor interoperability aspects”?

13 – Intel China Ltd.

We share similar view with AT&T that ‘taking into account’ is preferred, so we support the latest version provided by moderator.

And for the change of ‘e.g.’ to ‘i.e.’, we prefer ‘e.g.’. We would also like to highlight those that solutions 3 and 4 require SA/CT groups to update their specifications regarding subscription verification of the NCR and we think it is better to capture this impact to SA and CT groups in the WID already.

Regarding the inter-vendor interoperability aspect, in general, we share same view with QC on need to support multi-vendor interoperability. But it is also fine to take this into account during the down-selection in the WI phase when there is a better understanding of the solutions.

14 – CATT

We are fine with the moderator’s proposal in current version. Changing the wording ‘based on’ to ‘taking into account’ is also fine.

15 – ZTE Corporation

We are fine with the current wording, and flexible with the selection between ”based on” and ”according to”. Regarding the additional criteria for down-selection, still prefer to do it in the normative phase.

16 – HuaWei Technologies Co.

First we support QC’s proposal to add inter-vendor operability, if it is only for a single vendor, this is purely implementation and there is nothing to do with standards. Our company was not listed in the counting although we actually commented in the intermediate round.

Secondly we support to keep “based on”, because without SA3 and SA5 feedback, we don’t see how we can proceed with down selection in RAN2 and RAN3. We somehow understand the comments from OPPO, companies will simply repeat the discussion as study phase and nothing can be concluded without feedback from SA3 and SA5. We think it should be clarified that RAN2/RAN3 shall not start down selection exercise without feedback from SA3 and SA5.

Thirdly for removing “validation”, our intention is not to exclude solution 1. However we believe the objective should be written in the neutral way without any hint on any solutions, and “identification and authorization” are the general terms we use for the objective, so as what we described in the study item. We think “validation” is oriented to a specific solution, and we still suggest to remove.

17 – Deutsche Telekom AG

We do not understand this entire solution and especially not why we can not down-select now here in RAN#97e so that we go with a CLEAR and FOCUSSED direction into the WI phase !

Option 2 is out because it does not work inter-vendor -> no further waste of WG time to analyse is needed.

Option 1 is depending on SA3 work for which an conclusion will be available when ?

Option 3 has much operator support in the recent discussion and is stright forward as it can resue much if not all from the IAB work.

Option might also work, but some operators expressed that they dislike this option (incli. Deutsche Telekom),

So the conclusion is that Option 3 should be selected ...

Remark: Honestly I expected a clear attempt in the thread to down-select 1 (!) option i order to safe time in the RAN and SA3/5 working groups.

18 – Deutsche Telekom AG

(sorry I meant DISCUSSION in my first sentence, not ”entire solution” ... ;-)

19 – BT plc

We are fine with the moderator’s proposal, changing the wording ’based on’ to ’taking into account’ is also okay for us. Any criteria for down-selection can be discussed in the WG.

20 – Ericsson LM

With AT&T’s clarification, we are OK with “taking into account” instead of “based on”. Indeed, the final decision is for RAN WGs to take. And we fully support QC and the other companies that want to clearly spell out that we shall only specify interoperable solutions. To ZTE: the TR conclusions say that down-selection may happen in the WGs, but do not preclude RAN discussing this or even taking a decision, if agreeable.

21 – Fujitsu Limited

We support the proposal by moderator.

RAN plenary can be used to resolve a WG contentious issue, but specifically this is a technical issue solvable in WG level. We believe such a micro-management should be avoided. In this sense, we are not supportive to add/remove any sentences which imply exclusion of the solutions.

22 – China Mobile Com. Corporation

We support moderator’s proposals. The technical details should be left to WG level, not in RAN plenary.

23 – Nokia Italy

We also support to include inter-vendor interoperability aspects. Furthermore, as mentioned by AT&T “Ok with down-selection in WI phase” and “Ok with The selected solution shall provide inter-vendor interoperability” are not mutually exclusive.

As expressed by many, the current wording of the objectives is not clear and it seems that different companies and people have different interpretation. In order to avoid confusion and different interpretation of the scope in RAN3 and RAN2 it would be important spell out explicitly what we mean rather than just changing couple of words in the Note. SA3 and SA5 will need to provide their feedback before RAN3 and RAN2 can consider the solution 1 and 2. Also, SA3 needs to confirm feasibility of Solution 1 and Solution 2 from a security point-of-view before these solutions could be considered for down-selection in RAN3/RAN2. This intent should be clear in the WID objectives, below we have provided our proposal for updating the WID objectives to be more clear:

Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]

- RAN3 and RAN2 to decide down-selection of solutions in solutions in section 8 of TR 38.867.

- Solutions 1 and Solutions 2 in the section 8 of TR 38.867 first require feedback from SA3 and SA5 before they can be down-selected, e.g. the feasibility of solution 1 and solution 2 needs to be confirmed from the security perspective by SA3 before RAN3 and RAN2 can considering down-selecting Solution 1 and 2.

- As part of down-selection process, RAN3 and RAN2 also need to ensure inter-vendor interoperability

~~NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed taking into account the feedback of other working groups (i.e., SA3 and SA5). From a security point of view, the feasibility of the NCR validation procedure in solution 1 and the feasibility of solution 2 are expected to be decided by SA3.~~

24 – Philips International B.V.

We agree with the need for inter-vendor interoperability and we support Nokia’s proposed text.

4.4 Scope on the RAN4 part of NCR

Please provide any further comments on whether the proposal is acceptable to you.

Proposal 4.4:

Core part:

Study and specify the RF and EMC requirements of NCR if necessary [RAN4]

Study and specify the RRM requirements of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR if necessary [RAN4]

Study and define the demodulation performance requirements for C-link of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Feedback Form 15: Q4-4: Any further comments on the updated RAN4 objectives?

<p>1 – AT&T GNS Belgium SPRL</p> <p>We support the moderator proposal.</p>
<p>2 – Qualcomm Incorporated</p> <p>We are fine with this version of the RAN4 objectives.</p>
<p>3 – Samsung Electronics Co.</p> <p>We are ok with RAN4 part</p>
<p>4 – China Telecommunications</p> <p>We support the moderator proposal.</p> <p>On the modulation part:</p> <p>As replied by ZTE in the intermediate round, some indication via C-link will be introduced by both semi-static and dynamic signaling, so demodulation requirements are needed for the physical channel in C-link. Regarding the detailed parameters for the demodulation requirements, the agreements in the WI core part will be followed.</p>
<p>5 – KT Corp.</p> <p>Support moderator’s proposal</p>
<p>6 – ZTE Corporation</p> <p>Support the proposals</p>
<p>7 – HuaWei Technologies Co.</p> <p>We are still concerned on the RRM part. The RRM functions to be supported are only proposed in the summary of intermediate round, and companies have not yet had chances to raise comments on it. From our side, we do not see need for a few functions, e.g. RRC re-establishment, RRC redirection. As we commented a few times, NCR is stationary and therefore we don’t see there is a need to support these mobility oriented functions. Thus we still think during the study we should add investigation of which</p>

RRM functions to be supported and add RAN2 as the involved WG. In addition we understand this part is only applicable for NCR-MT and therefore we'd like to add it to avoid any confusion.

Study the RRM functions to be supported and specify the RRM requirements of NCR-MT if necessary [RAN2, RAN4]

Regarding demodulation part, even though PDCCH/PDSCH is expected, it is not necessary to say the requirements need to be defined right now. If the MCS used is low, the performance would not be a problem even without defining the requirement. We are not so sure it is really urgent to include this at this stage, it is better to wait till RAN1 and RAN2 have much clearer design on NCR.

8 – Ericsson LM

On RRM objective:

We are confused about the following moderator's argument/justification to add RRM requirements.

"RRM requirement including 1) RRC Connection Mobility Control (RRC re-establishment, Random access, RRC release with redirection); 2) RLM; 3) Link recovery procedure; 4) NCR-MT timing requirements."

There is NO agreement that all these procedures will be supported or needed for NCR. NCR is fixed node and is repeater not node like IAB. Possibly timing error requirements might be needed but we have to wait and see agreements in other WGs.

We are fine with Huawei updated objective on the RRM requirements.

On demodulation objective:

The PDCCH/PDSCH even if used in dedicated mode, is used for configuration of NCR. The higher layer (L3) signalling is sporadic and low rate and will typically use low MCS. Agree with Huawei that the demodulation at low MCS will not be any problem. RAN4 demod requirements are defined under continuous scheduling to mimic user plan data. This is not the case with NCR configuration via PDCCH/PDSCH. We therefore agree with Huawei not to add any demodulation related objective at this stage. This can be revisited in future RAN once PDCCH/PDSCH design and NCR configuration aspects have been progressed in RAN1/RAN2.

9 – Nokia Italy

We share the views of Huawei and Ericsson and support Huawei's wording update for the RRM part.

4.5 Required TUs for Rel-18 NR NCR WI

Please provide any further comments on whether the TU sheet in RP-222437 is acceptable to you.

Proposal 4.5:

Adopt the TU plan in RP-222437.

Feedback Form 16: Q4-5: Any further views on TU plan of this WI?

1 – Qualcomm Incorporated

Again, as stated earlier, we still believe that moving the RAN2/3 TU start to November is beneficial as it provides more time to SA3/5 to provide feedback to the LS. We do not see any disadvantage in doing so. We do not believe that RAN2/3 will be able to do a lot of things before this down selection has occurred.

Since our suggestion was brushed aside in the prior rounds, it would be helpful if the moderator could at least clarify when exactly he expects SA3/5 to work on the NCR issue so that their reply can arrive in timely manner for the October RAN WG meetings, and on what topics RAN2/3 should work in case the feedback will not be available by that time.

2 – Qualcomm Incorporated

Again, as stated earlier, we still believe that moving the RAN2/3 TU start to November is beneficial as it provides more time to SA3/5 to provide feedback to the LS. We do not see any disadvantage in doing so. We do not believe that RAN2/3 will be able to do a lot of things before this down selection has occurred.

Since our suggestion was brushed aside in the prior rounds, it would be helpful if the moderator could at least clarify when exactly he expects SA3/5 to work on the NCR issue so that their reply can arrive in timely manner for the October RAN WG meetings, and on what topics RAN2/3 should work in case the feedback will not be available by that time.

3 – ZTE Corporation

As replied in the previous response, it should be noticed that except for the management, there is other scopes to be discussed in RAN2/3. It's not reasonable to postpone the discussion.

4 – HuaWei Technologies Co.

We support Qualcomm's comment, to leave everything uncertain to WGs would only waste time and lead to unnecessary debate. We support to start work in RAN2 and RAN3 in November and only focuses on the signaling part based on RAN1's input from October meeting. The down selection shall not be started before feedback from both SA3 and SA5, which is a fair manner to the solutions on the table. We think this can be clarified in this plenary so that companies are clear what and when to be discussed in Q4 in RAN WGs.

5 – Deutsche Telekom AG

We could save some time, if RAN plenary this week would have the courage to decide something = down-select only on option for the management ! RAN has the obligation to give guidance to the WGs where possible and help minimising unnecessary efforts in the WGs

6 – Ericsson LM

We fully support QC's observations.

7 – China Mobile Com. Corporation

We are ok to postpone the discussion of down selection for the 4 solutions until LS received. But RAN2 can continue discuss other details that triggered by RAN1.

8 – Nokia Italy

We share the view of Qualcomm. Especially if TUs are allocated to RAN3/2, it is important to clarify the expectations in the objectives.

4.6 Other comments on the proposed WID

Please find the updated version of the proposed WID in the following folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/\[97e-13-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/[97e-13-R18-NCR])

Besides the above discussion on the objectives in sections 4.1-4.4, please provide any other comments (including co-sourcing support of the WID) on the proposed WID in the following feedback form.

Feedback Form 17: Any other comments on the proposed WID?

1 – Samsung Electronics Co.

Regarding draft WID, we have following comments

- For second shade: we prefer to change "The NCR is not expected to process information forwarded between UE and network"
- For third shade: move this bullet to highest level and add "Further study ... ", considering conclusion in SID and discussion in RAN1 SI, our suggestion is fair based on the trust of WG's technical discussion.
- For forth shade: ok for current version.

2 – Intel China Ltd.

For section 8 (aspects that involve other WGs), we should also add CT 4 because solutions 3 and 4 require SA/CT groups to update their specifications. So, we suggest the following revision:

8 Aspects that involve other WGs

SA2 may need to capture the impacts of NCR on CN. This involves:

- Enhancements to signalling on NG interface.

- Description of NCR functionality in stage-2 specifications of EPS and 5G architecture (TS 23.401, TS 23.501 and TS 23.502).

CT4 may need to capture impacts of NCR on CN for providing subscription data (TS 29.503)

SA3 may need to assess and verify the security assumptions made for NCR and update the 5G security architecture spec accordingly (TS 33.501)

3 – Kyocera Corporation

Kyocera Corporation is happy to be listed as a supporting company.

5 Final Summary and proposals

5.1 Observation and proposal for scenarios and assumptions

As observed from the feedback received, majority is fine with the proposal but still with received comments on following aspects:

1. Applicable frequency range:

In total, 25 companies including [VDF, AT&T, TIM, Philips, Sony, Fujitsu, BT, DT, LGE, Kyocera Corporation, NTT DCM, ZTE, Lenovo, CATT, ITRI, NICT, KDDI, Apple, KT, China Telecom, Intel, Telstra, FirstNet, QC,AT&T] prefer to revert it back to the intermediate round proposal.

Meanwhile, [CMCC] is fine with current version but highlights that the technologies for the NCR should not be differentiated between FR1 and FR2. We could focus on FR2 design and the technologies should also be compatible to FR1.

However, further concerns on the existing version (copied from SI) have been raised by [Ericsson, HW] to update the proposal, e.g., adding “used for network coverage in FR2 bands and also FR1 bands in as much they rely on specification for FR2 bands.”

From moderator’s perspective, it’s more reasonable to follow the majority’s view since companies still have the concern to reuse the wording in the NCR SID.

2. NCR’s behavior over the data forwarded to UE:

In general, 4 companies including [Lenovo, NICT, KDDI, Spreadtrum] are fine with the existing version. Meanwhile, the updated version is also proposed by [Sony, QC, Samsung, Ericsson] including “remove the dedicated” and other editorial changes. However, [vivo, Panasonic] have concerns on the removal of “dedicated”.

Then, following the suggestion from 14 companies including [VDF, DT, Philips, Fujitus, DT, HW, ZTE, CATT, CMCC, KT, IIT Kanpur, Intel, Panasonic, OPPO], it’s more reasonable to keep the same wording as SI without additional changes.

Operation over different sub-band issue: One company re-iterate the preference to including the operation over multiple-sub-band and highlight the needs of corresponding enhancement. From moderator’s perspective, the corresponding details including potential solutions can be further discussed in normative phase.

Therefore, the moderator suggests to update the proposal as follows:

Proposal 5.1:

The normative work of NR network-controlled repeaters is planned to focus on the following scenarios and assumptions:

- Network-controlled repeaters are inband RF repeaters used for extension of network coverage on FR1 and FR2 bands based on the NCR model in TR38.867.*
- For only single hop stationary network-controlled repeaters*
- The NCR is transparent to the UE.*
- Network-controlled repeater can maintain the gNB-repeater link and repeater-UE link simultaneously*

5.2 Observation and proposal for the scope on the side control information design and signalling

As observed from the feedback received, the situation on the PC seems unchanged. For the proposed compromise from moderator, in general:

15 companies including [AT&T, QC, Telstra, vivo, KT, Apple, CMCC, ITRI, CATT, Lenovo, ZTE, Huawei, Kyocera, BT, Fujitsu] are fine with existing version and [Intel] also highlights that the related work can be done after RAN#98e. Meanwhile, 5 companies [CEWiT, NEC, Panasonic, Huawei, Fujitsu] prefer to extend the scope by replacing the backhaul link via NCR-Fwd.

However, 12 companies including [Ericsson, Pivotal, SS, KDDI, Spreadtrum, China, CATT, NTT DCM, DT, Nokia, Philips, Sony] have concerns to include it in WI and 11 of them propose to further study it in RAN1.

Therefore, considering the limited TU in RAN1, moderator suggests to trigger the potential study on PC if sufficient progress on other aspects are achieved with following proposal:

Proposal 5.2:

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming*
- UL-DL TDD operation*
- ON-OFF information*

Note: Power control information will be checked in RAN#98e.

Specify control plane signalling and procedures [RAN2, RAN1]

- The configuration of signalling for side control information indication*

NOTE: Down-selection of solutions in section 7.2 of TR 38.867 is needed

5.3 Observation and proposal for the scope on repeater management

As observed from the feedback received, in general,

6 companies including [Apple, CT, CATT, ZTE, Fujitsu, CMCC] are fine with existing version and [AT&T, Intel, CT, CATT,BT,Ericsson] prefer to replace the “based on” by “taking into account, but [HW] prefer to keep it.

Meanwhile, 9 companies including [QC, Telstra, AT&T, KT, KDDI, Intel, Huawei, Nokia, Philips] prefer to add the wording “The selected solution shall provide inter-vendor interoperability”

[DT] highlights that only Solution-3 is preferred and [Nokia] also propose to refine the note. From moderator’s perspective, it’s more suitable to conduct the down-selection in WG-level and the remaining part of note is same as the TR’s description.

Therefore, the moderator suggests to update the proposal as follows:

Proposal 5.3:

Specify the solution of network-controlled repeater management (i.e., the identification and authorization/validation of NCR) [RAN3, RAN2]

- *NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed taking into the account the feedback of other working groups (i.e., SA3 and SA5). From security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3. The selected solution shall provide inter-vendor interoperability.*

5.4 Observation and proposal for the scope on RAN4 part of NCR

For the RAN4’s aspect, 6 companies including [AT&T, QC, Samsung, CT, KT, ZTE] are fine with existing version, but 3 companies including [Ericsson, HW, Nokia] propose the further updates on the RRM and demodulation part.

Regarding the comments on RRM, it’s fine to further check it with involvement of RAN2. For the demodulation part, it can be checked in RAN#98e based on the progress of signalling design.

Therefore, the moderator suggests to update the proposal as follows:

Proposal 5.4:

Core part:

Study the RRM functions to be supported and specify the RRM requirements of NCR-MT if necessary [RAN2, RAN4]

Study and specify the RF and EMC requirements of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Perf part:

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR if necessary [RAN4]

Note: The existing requirements defined in RAN4 can be reused if applicable.

Note: The demodulation requirement can be checked in RAN#98e

5.5 Observation and proposal on the required TUs

For the TUs, 4 companies including [QC, Huawei, Ericsson, Nokia] propose to specify the potential aspects which can be discussion in RAN2/3 without changes of original TU plans. From moderator's perspective, in the upcoming meeting, RAN2 can work on the configuration of side control signalling and procedure, also discussion on the required RRM aspects. For RAN3, even without feedback from other working groups, down-selection among solution 3 and 4 can also be discussed.

Therefore, the moderator suggests to keep the original TU and Let the work group chair to handle the details.

5.6 Overall Proposal

Proposal 5.6: Approve WID RP-222649 with the objectives from sections 5.1-5.4

6 Extended Round

Here are some further comments from the moderator:

1. Regarding proposal 5.1, there is a clear majority's view on not to capture any prioritization between FR1 and FR2 in the assumptions/scenarios. Some operators have strong concerns on capturing any prioritization. Since there is a study phase for RAN4 requirements anyway, companies can further discuss this in RAN4. On the NCR behavior over forwarded data, there are different views on detailed wordings like "dedicated" vs no "dedicated", "process" vs "decode", "exchanged" vs "forwarded", etc. It sounds like we are doing detailed wording on specification already. From the moderator's perspective, I tried different versions in the 3 rounds but failed. I don't think we can reach any consensus on the detailed wording suddenly in less than 1 day. It is more appropriate to leave this kind of detailed discussion in RAN1. This seems to be a clear majority's view in the final round.
2. Regarding proposal 5.2, I tried to find a middle ground on supporting power control but failed to do it. It seems all the proponents can accept semi-static PC as the 2nd priority but opponents still want to do study although it has already been studied in the SI phase. From the moderator's view, it is not desirable to spend more time on study again especially considering very limited TU in this WI. Therefore, I suggest to check again the situation in RAN#98e depending on the progress of the higher priority side control information. Hope both sides can accept the current situation.
3. Regarding proposal 5.3, the note "The selected solution shall provide inter-vendor interoperability." has been added. Hope the proponents of solution 2 can be flexible to accept this.
4. Regarding proposal 5.4, there is still different view on demodulation requirements although the majority is fine with this. I suggest to check this again in RAN#98e.

5. Regarding TUs, there is a view to delay the RAN2/3 part to at least November but after checking with RAN2/3 Chairs, it seems we can keep the original TU allocation. There are topics to be treated while waiting for feedback from SA WGs.

The WID RP-222649 has captured proposals 5.1-5.4. Please provide further comments altogether for all objectives and the other content in the WID. Please refrain from repeating the same comment from the previous rounds unless you really have a strong concern.

Proposal 6: Approve WID RP-222649 with the proposed objectives in sections 5.1-5.4

Feedback Form 18: Any further comments on the WID RP-222649?

1 – FirstNet

Agree with Proposal 6. Please add FirstNet as one of the supporting IMs.

2 – Qualcomm Incorporated

We are fine with the present version of the WID.

5.1: We support the majority view on FR1 and FR2. We agree that there is no need to capture anything on the NCR's handling of the NCR FWD traffic.

5.2: We would like to see PC as part of side control, but we recognize that there is some objection. The present note certainly strikes a fair compromise since it provides the opportunity to continue the discussion in December after progress has been made in RAN1.

5.3: We are happy to see that the moderator has adopted a compromise, i.e., keeping solution 2 on the table while including the requirement for inter-vendor interoperability. In this manner, proponents of solution 2 can show how the solution can be made inter-vendor interoperable.

5.4: We support the present RAN4 objectives.

5.5: We are fine with the TU allocation after feedback from RAN2/3 chairs.

3 – AT&T GNS Belgium SPRL

AT&T is ok with this version of the WID with some small comments.

Note that there is inconsistency in the Tdoc numbers (in NWM proposal versus what was uploaded to the inbox **RP-222659** or **RP-222649**) and some typos corrected in the previous rounds are still persistent as highlighted below:

1. "With these considerations, NR NCR supports the following features:"

2. ”- *NOTE: Down-selection of solutions in section 8 of TR 38.867 is needed taking into ~~the~~ account the feedback of other working groups (i.e., SA3 and SA5). From a security point of view, the feasibility of NCR validation procedure in solution 1 and the feasibility of solution 2 will be decided by SA3. The selected solution shall provide inter-vendor interoperability.*

Some other general clean-up:

1. As a reminder from the WID template: *{Guidance text shown in curly brackets, in italics. All guidance text is to be deleted before WID submission.}*

2. Also add SA5 to section 8.

4 – ZTE Corporation

Moderator’s reply

Thanks AT&T for pointing this out. Sorry for the inconsistent tdoc number between my email and this NWM. Now this is fixed to **RP-222649**.

5 – Panasonic Corporation

Thanks for the update.

On ”Note: Power control information will be checked in RAN#98e”, as it is not only the information but related behaviour, could you update as ”Note: Power control **aspect information** will be checked in RAN#98e.”

On ”The selected solution shall provide inter-vendor interoperability”, although we agree this, this shall not specific to network-controlled repeater management but in general. We would like to have the need of inter-vendor interoperability as generic requirement. ”The design shall provide inter-vendor interoperability” can be described not under the sub bullet of network-controlled repeater management.

6 – NEC Corporation

Agree with Proposal 6. Please add NEC as one of the supporting IMs.

7 – ZTE Corporation

Moderator’s reply:

Please check the latest version (addressing most of the latest comments) of the WID in the following draft folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/\[97e-13-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/[97e-13-R18-NCR])

The current latest version is v3 i.e.

RP-222xxx New WID proposal for NR network controlled repeaters_rm_v3.doc

Support of the WID would be appreciated.

8 – China Telecommunication Corp.

We agree with Proposal 6. Please add China Telecom as one of the supporting IMs.

9 – Nokia Italy

Thanks to the moderator for this effort. We support v3 of the WID. Please add Nokia and Nokia Shanghai Bell as supporting members.

10 – Nokia Italy

Thanks to the moderator for this effort. We support v3 of the WID. Please add Nokia and Nokia Shanghai Bell as supporting members.

11 – ZTE Corporation

Moderator's reply to Panasonic:

Regarding Panasonic's suggestion on moving the note related to inter-vendor interoperability to higher level, the multi-round discussion has been focused on the particular objective related to the 4 candidate solutions of repeater management. Please understand that, from the moderator's perspective, I would like to avoid triggering new discussion on other aspects at this late stage. Hope this can be acceptable to you.

12 – NICT

We agree with the present version of the WID. Thanks to the moderator for this effort. Please add NICT as one of the supporting members.

13 – Panasonic Corporation

Thank for the reply and to update "power control information" to "power control aspect".

My understanding is the need of inter-vendor interoperability is not specific to repeater management but general. On the other hand, as the moderator said, I can understand to avoid the new discussion in the last day would be desirable. Then I'm ok without moving the note related to inter-vendor interoperability to higher level.

14 – Intel China Ltd.

We are fine with WID_v3. Just one minor update, we think TS 23.008 under CT4 would also be impacted, so we suggest to add TS 23.008 in section 8.

15 – Intel China Ltd.

We are fine with WID_v3. Just one minor update, we think TS 23.008 under CT4 would also be impacted, so we suggest to add TS 23.008 in section 8.

16 – KT Corp.

KT agrees with Proposal 6 and please add "KT Corp." in the supporting company list.

17 – China Mobile Com. Corporation

We are fine with current version of WID. Please add CMCC as one of the supporting IMs.

18 – NTT DOCOMO INC.

Thank you very much to the moderator for the effort. We support v3 of WID, and please add NTT DO-COMO as supporting members.

19 – LG Electronics France

We are fine with the current WID. Please add LG Electronics as a supporting company.

20 – LG Electronics France

We are fine with the current WID. Please add LG Electronics as a supporting company.

21 – ZTE Corporation

Moderator's reply:

Please check the latest version (addressing most of the latest comments including Intel's update on CT4 spec number) of the WID in the following draft folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/\[97e-13-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/[97e-13-R18-NCR])

The current latest version is v4 i.e.

RP-222xxx New WID proposal for NR network controlled repeaters_rm_v4.doc

Support of the WID would be appreciated.

22 – ZTE Corporation

Moderator's reply:

Please check the latest version (addressing most of the latest comments including Intel's update on CT4 spec number) of the WID in the following draft folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/\[97e-13-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/[97e-13-R18-NCR])

The current latest version is v4 i.e.

RP-222xxx New WID proposal for NR network controlled repeaters_rm_v4.doc

Support of the WID would be appreciated.

23 – HuaWei Technologies Co.

Thanks for the efforts. As many companies do not want to have any restriction on the first bullet of the discussed scenarios, we can compromise but still think in RAN4 work part, we add a note like: **the work relevant to beamforming should focus on FR2**, as we doubt it is feasible for RAN4 to define this for FR1 and seems in previous summary the moderator also agreed.

Regarding RRM part, as we commented in the previous two rounds, this is only applicable for NCR-MT, and therefore we think for RRM objectives of Core and performance parts, it is more accurate to say **NCR-MT** instead of NCR.

With the above, we are fine with the WID proposal.

Some other comments than the WID itself, we see there was some suggestion from the moderator on what to be treated in RAN2 and RAN3. “From moderator’s perspective, in the upcoming meeting, RAN2 can work on the configuration of side control signalling and procedure, also discussion on the required RRM aspects. For RAN3, even without feedback from other working groups, down-selection among solution 3 and 4 can also be discussed.” we think this is in general OK, but for the down-selection among solution 3 and 4, RAN2 should also be involved, it is not only RAN3’s work. We think it is good to capture this common understanding in this plenary, i.e. **in Q4 RAN2 can work on the configuration of side control signaling and procedure, RRM aspects, and RAN2&RAN3 can have down selection among solution 3 and 4**, so that companies are clear on what to be discussed in Q4.

24 – Philips International B.V.

We appreciate the moderator’s efforts in preparing the new WID. We are fine with v4 - please add Philips as a supporting company.

25 – Samsung Electronics Co.

Appreciated the moderator’s effort and Samsung can stand supporting company.

26 – Sony Group Corporation

We thank the moderator for the efforts in guiding this discussion. We are happy with v4 of the WID and would like to have Sony added as a supporting company.

27 – ZTE Corporation

Moderator’s reply:

To Huawei,

First, I incorporated your suggestion on changing NCR to NCR-MT in v5 in the draft folder.

Regarding whether RAN4 work only focuses on FR2, I would like to avoid this discussion in RAN plenary since there is a clear majority prefers not to do any prioritization between FR1 and FR2. Since there is a study phase for RAN4 requirements anyway, companies can further discuss this in RAN4. We expect such discussion will involve some details of FR1 requirements and the assessment of the corresponding RAN4 workload. As a moderator, I think it is more appropriate for RAN4 to decide their detailed work. Similarly,

for RAN2/RAN3, I will leave this to RAN2/3 Chairs to coordinate with the rapporteur to come up with the detailed work plan.

28 – ZTE Corporation

Moderator's reply:

Please check the latest version (addressing most of the latest comments including Huawei's suggestion) of the WID in the following draft folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/\[97e-13-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_97e/Inbox/Drafts/[97e-13-R18-NCR])

The current latest version is v5 i.e.

RP-222xxx New WID proposal for NR network controlled repeaters_rm_v5.doc

Please also check V3 of the TU budget xls sheet in the same folder. The changes are made only on the RAN4 parts after checking with RAN4 Chair.

29 – vivo Mobile Communication Co.

Thanks for the efforts, please add vivo as a supporting company.

30 – Fujitsu Limited

Thanks moderator for the efforts. Please add Fujitsu as a supporting IM (our name was listed in RP-222649, but removed from the running draft. just in case ...)

31 – Fujitsu Limited

Thanks moderator for the efforts. Please add Fujitsu as a supporting IM (our name was listed in RP-222649, but removed from the running draft. just in case ...)

6.1 Observation

In the extended round discussion, almost all companies expressed their views on supporting/accepting the proposed WID after some minor updates. Only one company still has expressed their concern on FR1 and FR2 prioritization in RAN4 and provided suggestion on the RAN2/RAN3 work management in Q4.

7 Conclusion

Based on the discussion, it is proposed to approve RP-222667 New WID on NR network-controlled repeaters.

8 References

[1] RP-213469 Summary for RAN Rel-18 package, RAN#94-e

[2] RP-221229 Revised SID on NR network-controlled repeater, RAN#96-e

[3] RP-222138 Status report of SI: Study on NR network-controlled repeaters, ZTE

- [4] RP-222323 TR 38.867 v1.0.0 for NR Network-Controlled repeater, ZTE
- [5] RP-222437 New WID on NR network-controlled repeaters, ZTE, Sanechips
- [6] RP-222438 Motivation on New WI on NR NCR, ZTE, Sanechips
- [7] RP-222078 Discussion on WI scope for network-controlled repeaters, Rakuten Mobile, Inc
- [8] RP-222086 Views on Network Controlled repeater WI, Fujitsu Limited
- [9] RP-222128 Discussion on the WI scope of NR network-controlled repeaters, CMCC
- [10] RP-222158 Motivation for normative phase on NCR, Qualcomm Incorporated
- [11] RP-222230 On the work scope of Rel-18 NR network-controlled repeaters, Samsung
- [12] RP-222261 Views on Network-controlled Repeaters (NCR) WI, Intel Corporation
- [13] RP-222310 Collecting RAN Input on NCR, Ericsson LM
- [14] RP-222394 Discussion on R18 NR Network-controlled Repeaters, CATT
- [15] RP-222472 Views on the Rel-18 study on NR Network-controlled Repeaters, Huawei, HiSilicon
- [16] RP-222481 On the scope of WI for Rel-18 NR network-controlled repeaters, Apple Inc.
- [17] R3-225253 LS on NCR Solutions, RAN WG3